

FINE ARTS DEPARTMENT

Stack

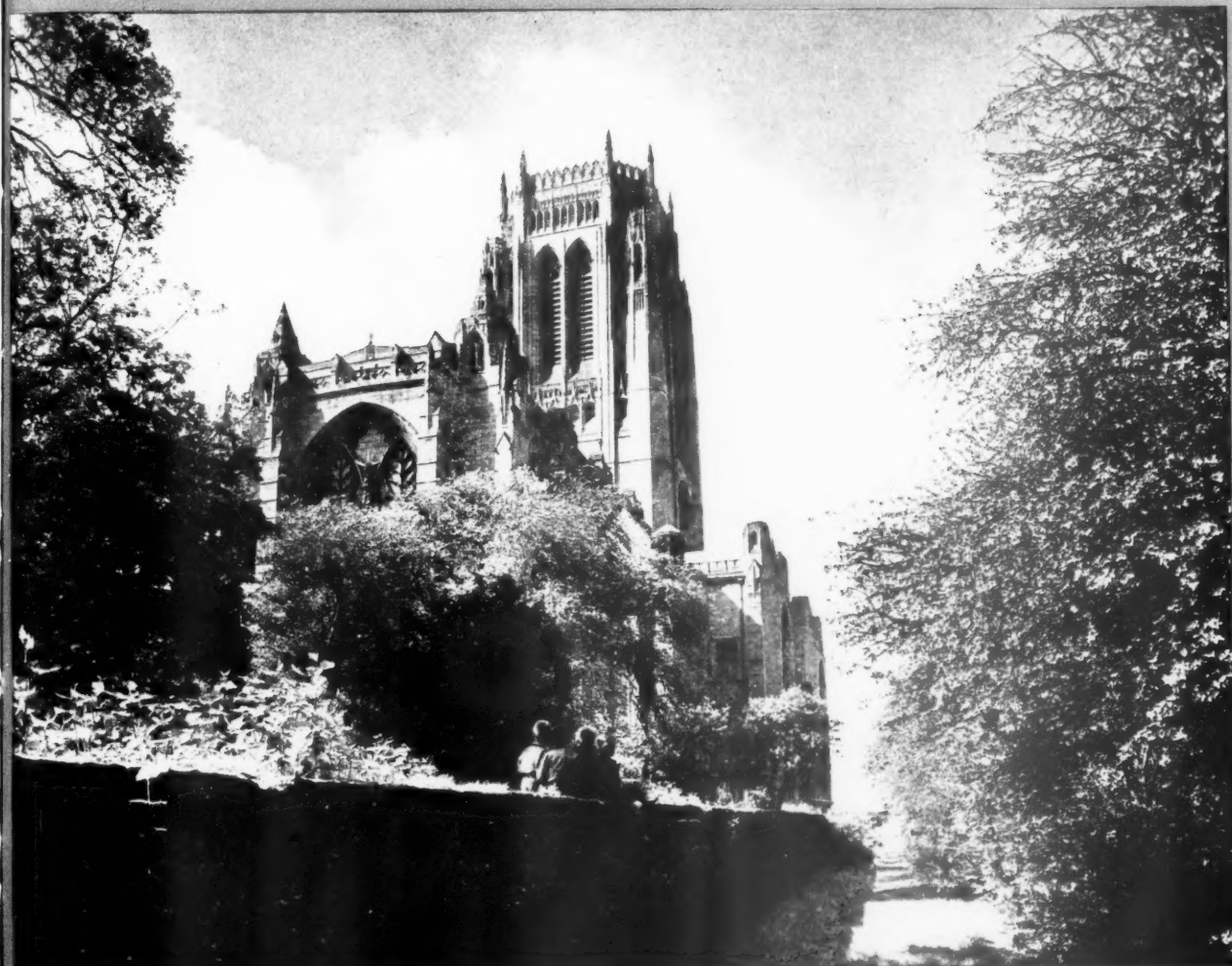
THIRD SERIES VOL 62 NUMBER 11

SEPTEMBER 1955

PUBLIC LIBRARY
DETROIT

THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

66 PORTLAND PLACE LONDON W1 • TWO SHILLINGS AND SIXPENCE



Liverpool Cathedral. From a photograph by V. R. Brazdant



PILKINGTON'S **"ARMOURPLATE" Glass Doors**
make the most inviting entrances.

These are the doors for the business that wants to be in the public eye. Fitted into a fashionable shop front or a dignified office lobby, they help to bring a message out on to the pavement . . . arresting the eye, guiding the step. "ARMOURPLATE" Glass Doors are supplied in two sizes and with a choice of contemporary fittings. For full details write to:—

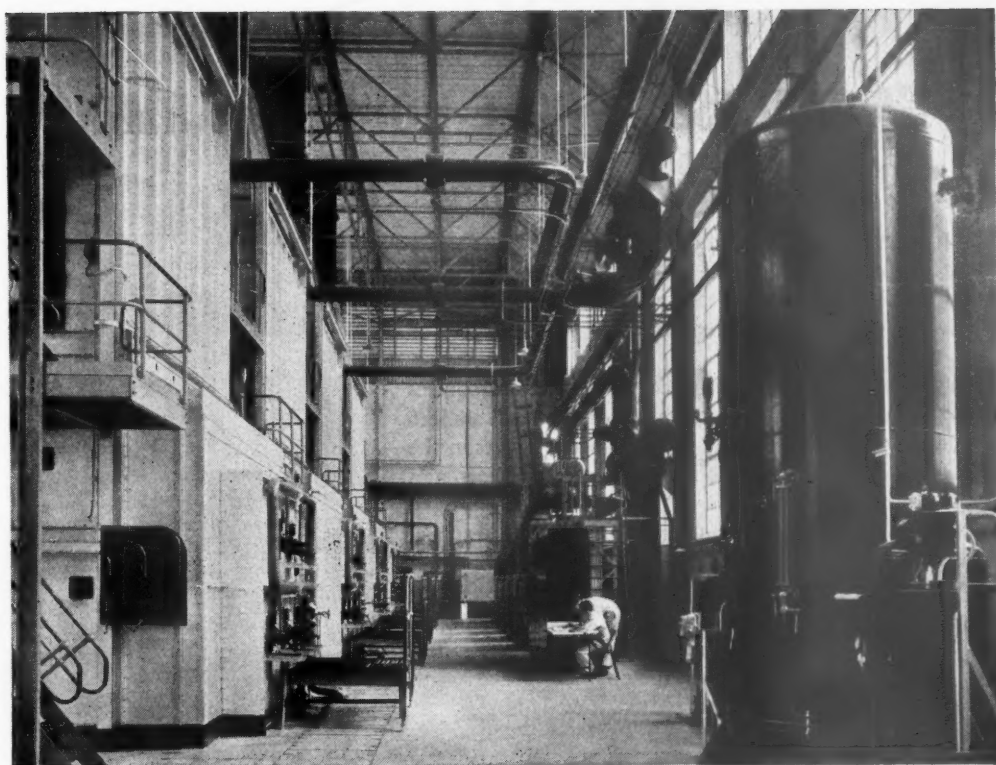
P I L K I N G T O N B R O T H E R S L I M I T E D

CONSULT THE TECHNICAL SALES AND SERVICE DEPARTMENT, ST. HELENS, LANCs. (TELEPHONE: ST. HELENS 4001), OR SELWYN HOUSE, CLEVELAND ROW, ST. JAMES'S, LONDON, S.W.1. (TELEPHONE: WHITEHALL 5672-6). SUPPLIES ARE AVAILABLE THROUGH THE USUAL TRADE CHANNELS.

ADA15

"ARMOURPLATE" IS A REGISTERED TRADE MARK OF PILKINGTON BROTHERS LIMITED.





Architects : Harry S. Fairhurst & Sons, F.R.I.B.A.

High pressure hot water oil fired boiler plant at
Leyland Motors' Lancashire factory

G.N. HADEN & SONS
LTD



HEATING • VENTILATING • AIR CONDITIONING
PLUMBING • INDUSTRIAL PROCESS SERVICES

HEAD OFFICE : 19-29 WOBURN PLACE, LONDON, W.C.1. TERminus 2877

and Branches throughout the Provinces

Radiation

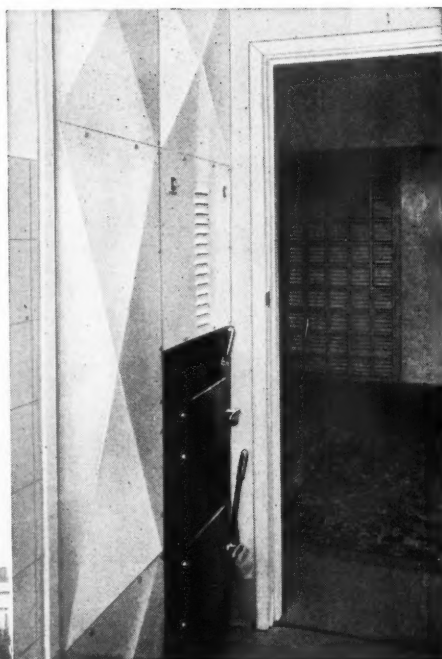
SMOKELESS WHOLE-HOUSE WARMING

installed in modern home

The architect wisely specified Radiation Whole-house Warming for this house at Ashridge, Hertfordshire. One small solid fuel burning unit keeps the whole house thoroughly, *evenly* warm—and supplies constant hot water for all domestic needs.

The system is automatically controlled and requires practically no attention. It operates by ducting warm air into every room in the house, by way of small outlet grilles in the walls. It cuts out dirt and labour—increases comfort and healthy circulation of air without draughts.

Radiation's Whole-house Warming system, for houses, flats and public buildings, gives the same smokeless combustion and efficient heating, whether a gas, oil or solid fuel-burning unit is used. Any of these units can be specified to provide an integral and exceptionally efficient low-cost water heating system. For more detailed technical information, please write to our Chief Consultant.



An unobtrusive solid fuel burning unit fits into a small recess.



Warm air is ducted to every room in the house. Temperatures can be adjusted to the needs of the day and hour.
 Architect :
 Harold A. Rolls, L.R.I.B.A.,
 F.R.I.C.S., M.R.SAN.I.

Radiation

Pioneers of smoke reduction

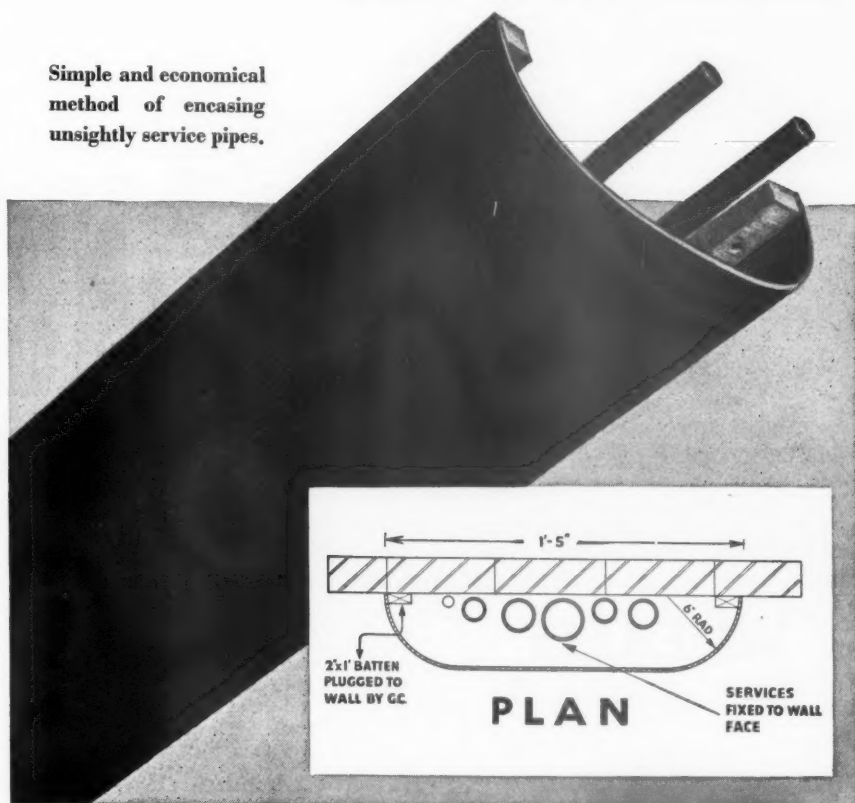
RADIATION GROUP SALES LIMITED, LANCELOT WORKS, WEMBLEY, MIDDLESEX.

Tel: Wembley 6221

Sundeala

PREFORMED HARDBOARD DUCT AND TRUNKING

Simple and economical
method of encasing
unsightly service pipes.



Full particulars and Technical Service from

SUNDEALA BOARD CO. LIMITED

Head Office: ALDWYCH HOUSE, LONDON, W.C.2. Tel.: CHAncery 8159

or from its Offices at

Glasgow: BALTIC CHAMBERS, 50, WELLINGTON ST., C.2

Newcastle: NORTHUMBRIA HOUSE, PORTLAND TERRACE, 2



WHEATLY



triton

ALMOST IMMEDIATE DELIVERY
CAN BE OFFERED AT THE TIME
OF GOING TO PRESS

Specimens of Wheatly Tiling may be seen at the Building Centre, London. Wheatly products include Single-lap Roofing Tiles, Ridge Tiles (blue and red), Floor Quarries, Air Bricks and Briquette Fireplaces.

"TRITON" *Light Brindled Pantiles*

for a house at Luton, Bedfordshire

*Architect: C. Gurney Burgess, L.R.I.B.A. of the
Peter Dunham Group, FAL/R.I.B.A.*

Roofing Contractors: Roberts Adlard & Co. Ltd., Watford

General Contractor: J. Newell, Caddington, Nr. Luton

WHEATLY & COMPANY LIMITED

SPRINGFIELD TILERIES

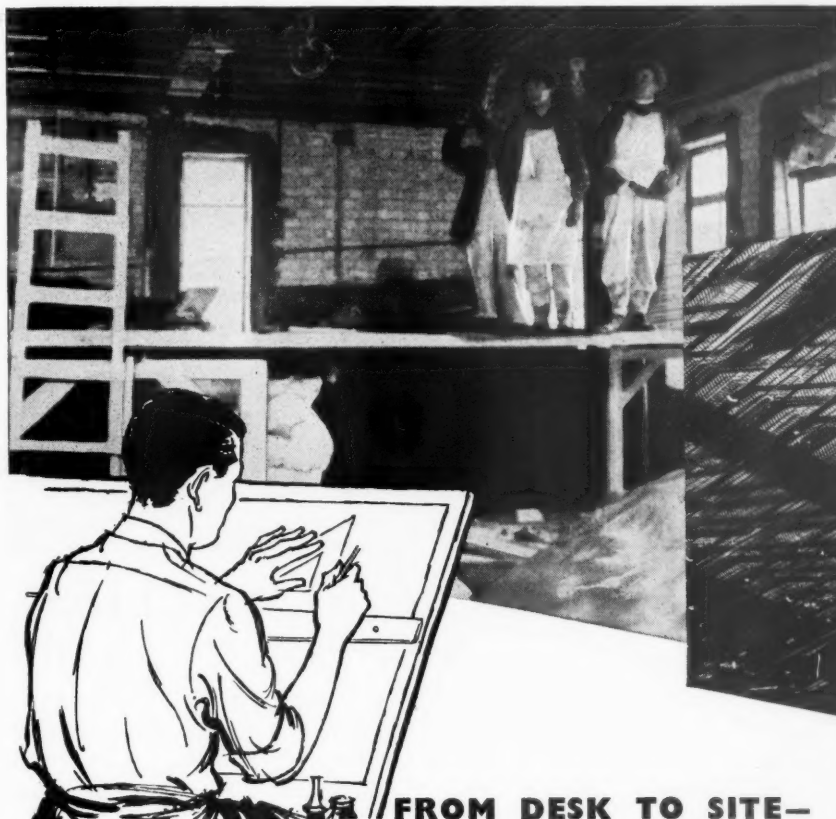
TRENT VALE

STOKE-ON-TRENT

Telephone: NEWCASTLE (Staffs) 66251

Telegrams: WHEATLY, TRENTVALE

WH47



FROM DESK TO SITE— A COMPLETE PLASTER LATHING SERVICE

A comprehensive service is offered with the "Expamet" range of Expanded Metal Lathings. From a single source you get—the estimate, the design, the lathing and the fixing ready for plastering.

Ideal backgrounds. Expanded Metal Lathings can be used economically as a background for any type of plasterwork. The hundreds of meshes in each square foot form "keys" for the support of the plaster, and the lathings are also a reinforcement imparting a high degree of resistance to cracking. There are four main types available—

"BB" Lathing, "Expamet" Lathing, Rib-Lath and "Ribmet", to allow spacings between supports from 12 inches up to 5 feet according to the kind of work to be done.

Can be made to fit anywhere. Expanded Metal Lathings can be readily adapted to any style of background. Flat, arched, domed and vaulted surfaces can be formed with equal ease. The simple arrangement of furring and Expanded Metal can be made to fit anywhere. We shall be pleased to advise you in the choice and use of Expanded Metal for any job you have in mind.



THE EXPANDED METAL COMPANY LIMITED

51d Burwood House, Caxton Street, London, S.W.1. Telephone: ABBey 3933

P.O. Box 14, Stranton Works, West Hartlepool. Telephone: Hartlepool 2194

ALSO AT: ABERDEEN · BELFAST · BIRMINGHAM · CARDIFF · DUBLIN · EXETER · GLASGOW · LEEDS · MANCHESTER · PETERBOROUGH

RIB-LATH SUSPENDED CEILING IN DWELLING HOUSE, CARDIFF.
Architects: P. G. Budgen & Partners, Cardiff.

This detailed photo shows Rib-Lath in position ready to receive plaster.

RIB-LATH CEILING AT NEW EMPORIUM FOR THE MANX CO-OPERATIVE SOCIETY, DOUGLAS, I.O.M.

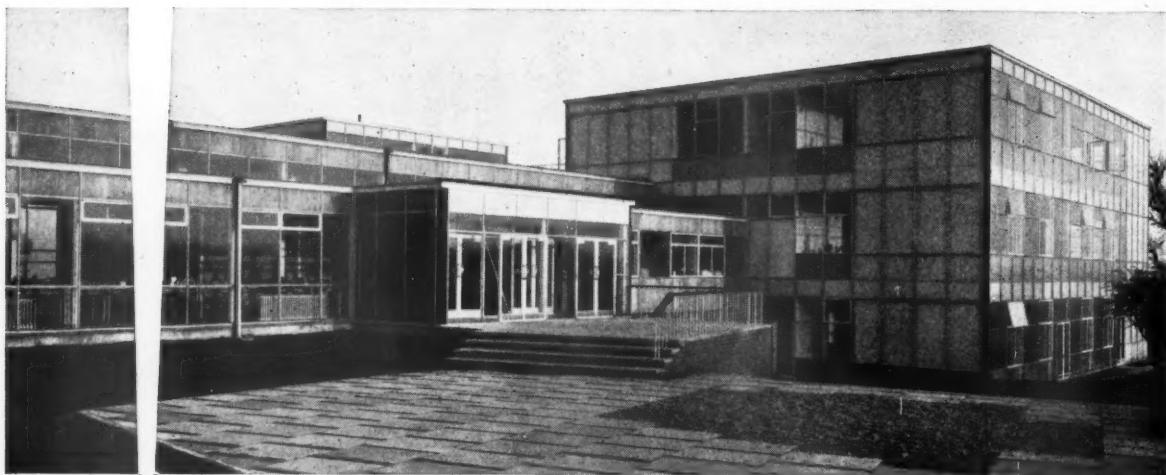
Architects: Co-operative Society Architectural Department, Manchester.
Chief Architect: G. S. Hay, A.R.I.B.A.
Contractors: C.W.S. Building Department, Trafford Park.

Plasterers: Foyle & Clucas, Douglas. 1,200 sq. yds. of Rib-Lath ceilings were fixed on this contract. The floor, after plastering, was as clean as before and quite free from droppings—proof of the excellent keying properties of Expamet Rib-Lath.

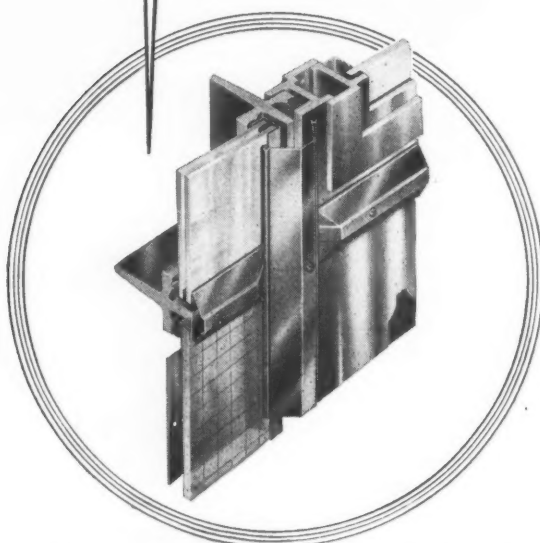
5-PART Plaster Lathing Service

- 1 Design with economy
- 2 Preparation of working drawings
- 3 Supply of 'backgrounds' for plasterwork (BB Lathing) (Rib-Lath) (Ribmet) (Angle & Casing Beads)
- 4 A complete fixing service
- 5 Technical advice and literature

'HILSULATE' PANELS



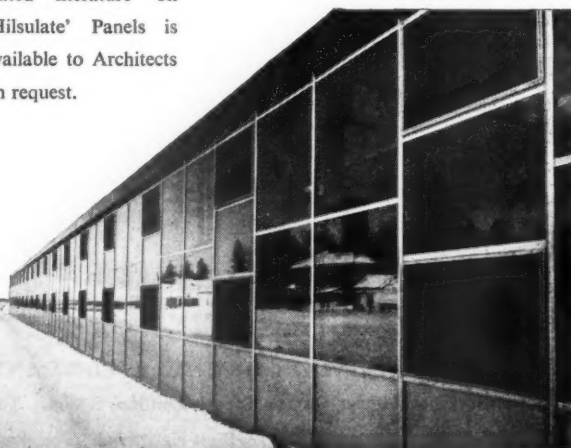
for HILLS GLASS CURTAIN WALLING



(Illustrated at top). Hurlfield Secondary Modern School for Girls, Sheffield. Architects Co-Partnership in collaboration with J. L. Womersley, A.R.I.B.A., A.M.P.T.I., City Architect.

(Right). The Wingham District High School, Toronto. Architects: Messrs. Kyles & Kyles.

THE result of many years' practical experience, Hills' system of Glass Curtain Walling is being extensively adopted in this country and in Canada. An attractive permanent cladding, most economical and speedily erected, it is particularly suitable for multi-storey constructions with large mass areas. Various types of infill panels are available, all offering high thermal resistance. These comprise 'Hilsulate' Double Glazed Panels (having the thermal value of $4\frac{1}{2}$ ins. brickwork), 'Hilsulate' Coloured Panels for solid wall areas, Aluminium faced Ply Coloured Panels for opaque areas and Single Glass Panels for lighting areas. Illustrated literature on 'Hilsulate' Panels is available to Architects on request.



HILLS (WEST BROMWICH) LIMITED

ALBION ROAD, WEST BROMWICH, STAFFS. Tel: WEST BROMWICH 1811 (15 lines).

LONDON: Chapone Place, Dean Street, W.1. Tel: GERrard 0526/9

Branches at Birmingham, Manchester, Bristol, Leeds, Newcastle upon Tyne, Glasgow and Belfast



*Du Cane Court, London, S.W. 17
Architect: G. Kay Green, Esq.*

Built over 16 years ago in —

PERFORATED



BRICKS

Recent reports on the merits of perforated bricks lend special interest to what is still one of the largest blocks of flats ever erected in London. The above building, erected before the war, was built of perforated

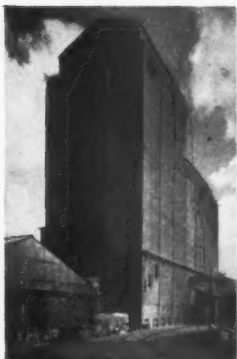
ACCRINGTON 'NORI'

wirecut bricks, to the specification of the Architect. The exceptional properties of the material used for 'Nori' bricks ensure adequate strength even when perforated. Production of these bricks will shortly be resumed and enquiries are invited.

THE ACCRINGTON BRICK AND TILE CO. LTD., ACCRINGTON, LANCs.

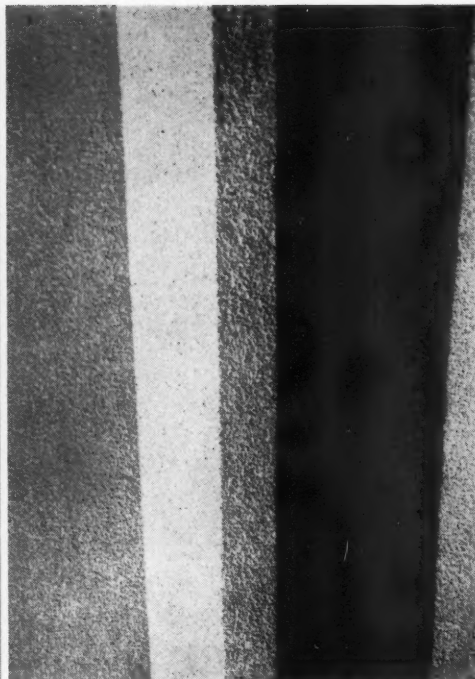
PHONE: ACCRINGTON 2684

Southern Representative: L. G. Rogers, Oak Lea, Main Road, Westerham Hill, Kent. Telephone No.: Biggin Hill 0538



On the Silcock Silo, steel reinforcement had corroded and disintegration of the concrete was taking place, as shown in the first illustration on the right.

At the extreme right the same detail appears after Pyrok was used for protective and decorative treatment. Work was executed by C & T (Pyrok Contracts) Ltd, London



PYROK

versus corrosion

Pyrok is a Vermiculite-cement surfacing applied by continuous spray, setting rapidly and adhering strongly to structural steelwork, concrete, stone, brick and fibre-board. Pyrok gives complete protection to structural steelwork and does not permit oxidation beneath its surface. Particularly effective against sulphurous fumes, Pyrok protects steelwork against fire and has in addition remarkable acoustic, insulating and anti-condensation properties.



BRITISH & FOREIGN PATENTS

Vermiculite surfacing
the modern way

Contracts are undertaken by Licensees in all parts of the U.K. and in countries abroad. We shall be glad to supply further information on request.

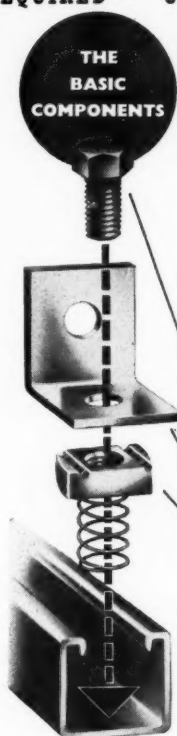
PYROK LIMITED 401-404 Montrose Avenue Trading Estate Slough Bucks tel: Slough 24061-5 'grams: Pyrokad Slough

LICENSEES U.K. C & T (Pyrok Contracts) Ltd London NW2 and at Brislington, Bristol, 4 E B Trumper (Surfacing) Ltd Birmingham Orthostyle Limited Scunthorpe Lincs Decorators (Liverpool) Ltd Liverpool 3 Matthew Thom & Co (Pyrok Contracts) Ltd Airdrie Scotland

This is UNISTRUT

THE QUICKER EASIER WAY TO
FRAME, HANG & SUPPORT ALL
ELECTRICAL, PLUMBING, HEATING
AND VENTILATING EQUIPMENT

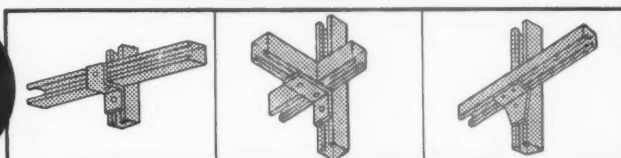
COMPLETELY ADJUSTABLE • NO DRILLING • NO WELDING • NO DETAIL DRAWINGS
REQUIRED • "UNISTRUT" SAVES TIME, LABOUR AND MONEY



THE
BASIC
COMPONENTS



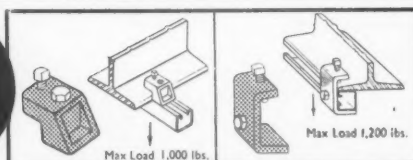
FRAMING
FITTINGS



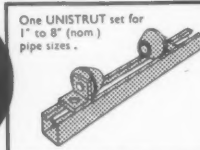
THE BASIC
COMPONENTS

Unistrut Bolt
 $\frac{1}{2}$ " and $\frac{3}{4}$ " sizes.
Unistrut Framing Fittings.
Unistrut Locking Nut.
Unistrut Channel
10'-0" and 20'-0" standard lengths.
12 gauge
Standard finish - Bonderized and
stove enamelled olive green. Also
available galvanized or plain,
oil protected.

BEAM
CLAMPS

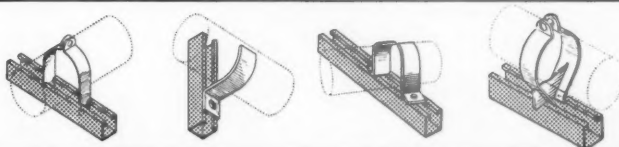


ROLLER
PIPE
SUPPORTS

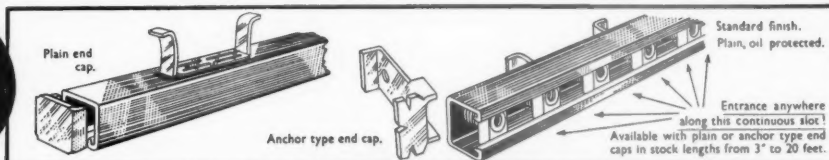


CABLE PIPE
AND CONDUIT
CLAMPS

There is a UNISTRUT
Clamp for $\frac{1}{2}$ " to 8"
(O.D. or nominal).



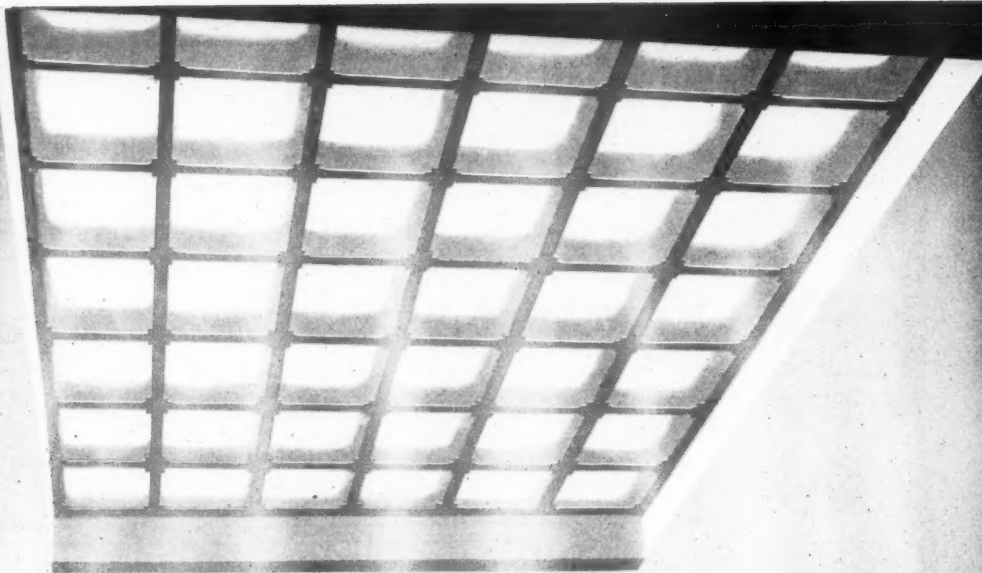
CONCRETE
INSERTS



UNISTRUT IS AVAILABLE
FROM ALL
SANKEY-SHELDON BRANCHES



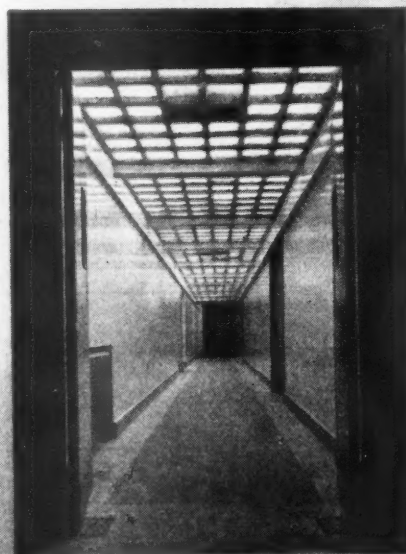
Send for complete catalogue today
UNISTRUT DIVISION OF
Sankey-Sheldon
Dept. (U1/BA8) 46, CANNON STREET,
LONDON, E.C.4



an abundance of daylight

..... with an abundance of strength. Purpose made and pre-cast (unless otherwise demanded) these ferro-concrete lights provide rigidity and strength, allied to maximum transmission of light. They are constructed to specified size, for any area.

Photograph by courtesy of Mr. P. J. Sheehan
—F.R.I.A., M.A.C.E.I. Architect for Limerick
Regional Hospital.

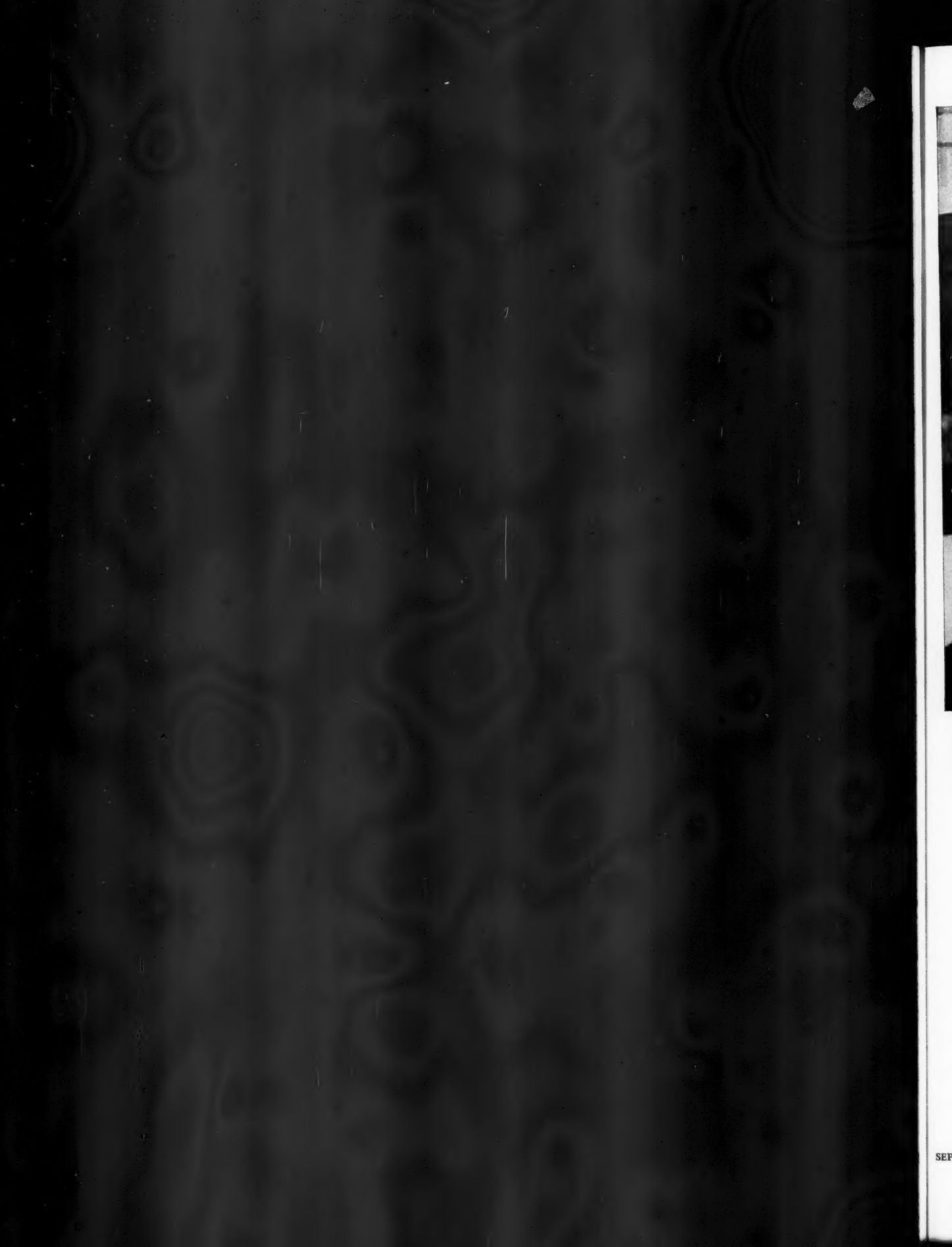


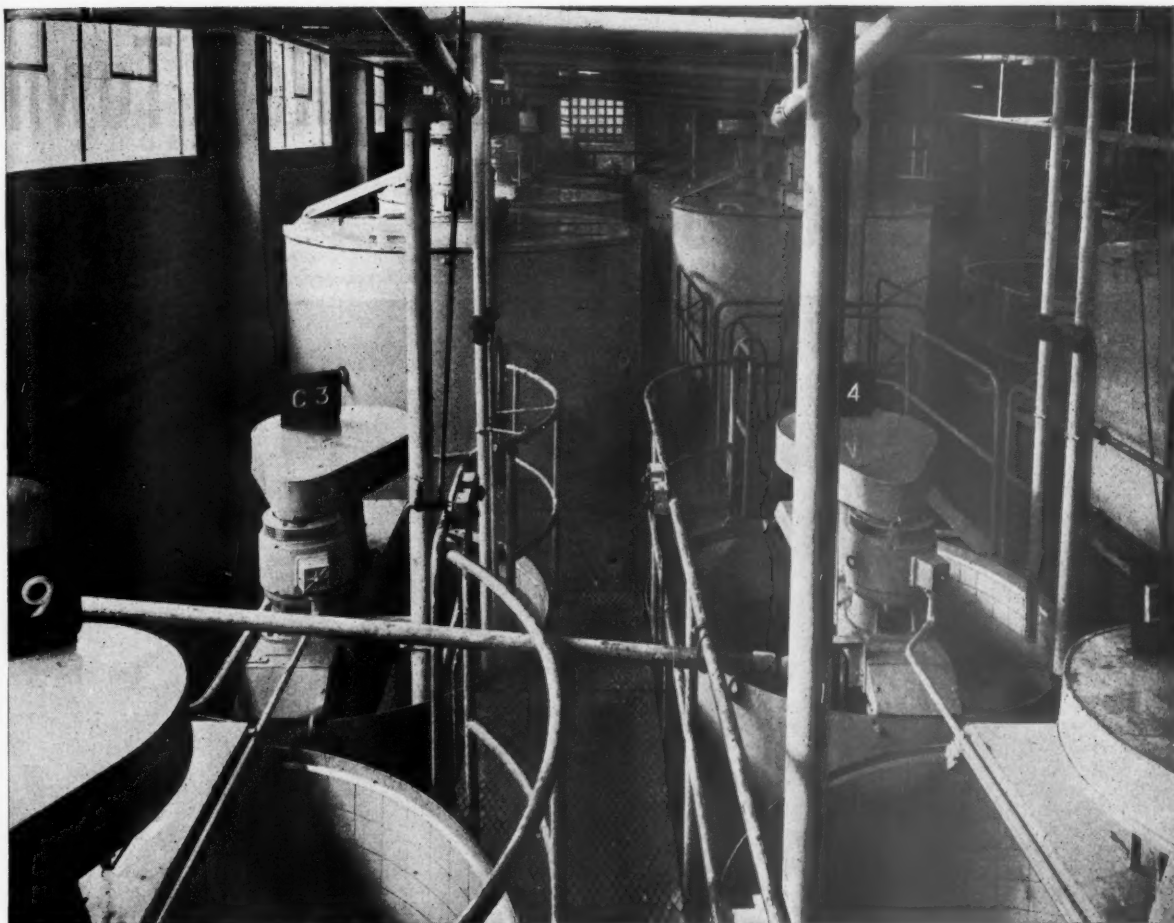
Crete-o-Lux Nine-X double construction roof lights at
Limerick Regional Hospital.

HAYWARDS CRETE-O-LUX LIGHTS

purpose-made for maximum efficiency

HAYWARDS LIMITED · UNION STREET · LONDON · S.E. 1
TELEPHONE: WATERLOO 6035 (PRIVATE BRANCH EXCHANGE) · ESTABLISHED IN 1793





By permission DOULTON & CO. LTD., Royal Doulton Potteries, Stoke-on-Trent

STEEL TANKS FOR CLAY MIXING LINED WITH
RICHARD TILES & FIXED BY

RICHAFIX

THE BRITISH TILE ADHESIVE

PERMANENT ADHESION ON BRICK, CEMENT, WOOD, STEEL,
PLASTER, ETC. NO HACKING REQUIRED.

Ask for Booklet RF2

RICHARDS TILES LTD

Factories: TUNSTALL, STAFFORDSHIRE (Stoke-on-Trent 87215)

London Office and Showrooms: Grand Buildings, Trafalgar Square, W.C.2. (Whitehall 2488 & 8063).

44 factories at HARLOW New Town all ventilated by COLT

FREDERICK GIBBERD ESQ. F.R.I.B.A., M.T.P.I.,
ARCHITECT PLANNER, THE HARLOW DEVELOPMENT CORPORATION.



This is one of several National industrial developments where COLT Ventilation equipment has been used. Others have been the Silicosis, Advance and Standard Factory Programmes and the Ex-Wartime Factories involving 96 Factories under Sir Percy Thomas & Son, F/A.R.I.B.A., The Wales and Monmouthshire Industrial Estates where for twenty-six factories COLT Ventilation equipment was specified by Jonah Arnold & Smith. The Remploy Factory Programme under the Ministry of Works where nearly one hundred factories were ventilated by COLT.

COLT Ventilation equipment has also been specified for many further contracts on Industrial Estates at Slough, Stevenage, Crawley, Trafford Park; for the Northern Ireland Advance Factory Programme, Scottish Industrial Estates, The Ministry of Supply Factories and Irish Estates Ltd.



PLEASE WRITE FOR FREE MANUAL, containing full specifications
of Colt Ventilators, to Dept. A40/146

VENTILATION



COLT VENTILATION · SURBITON · SURREY

Telephone: Elmbridge 6511/5

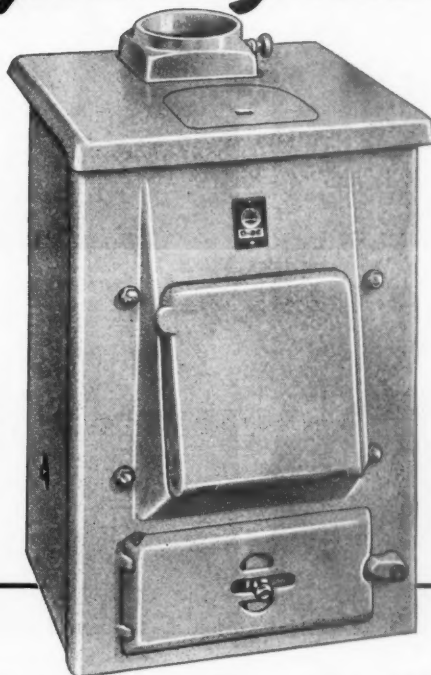
Branches at Birmingham, Bradford, Bridgend (Glam.), Bristol, Coventry, Dublin, Edinburgh, Liverpool, London, Manchester, Newcastle-upon-Tyne, Sheffield and Warwick.

Agents in Australia, Belgian Congo, Canada, Cyprus, India, Indonesia, Madagascar, Malaya, Mauritius, New Zealand, Pakistan, Portugal, North and South Rhodesia and South Africa.

NEW-replacing the No. O-DC

**HIGHER
EFFICIENCY**

**SMARTER
APPEARANCE**



**IMPROVED
DRAUGHT CONTROL**

**NO INCREASE
IN PRICE**

Ideal No. O-DE

DOMESTIC BOILER

The new Ideal No. O-DE Domestic Boiler is to replace the famous No. O-DC Boiler. It is more efficient and pleasing in appearance than its predecessor and is offered at the same low price. Enamelled Side Jackets are now included as standard.

The more important features are a new style primary air inlet in the ashpit door together with a re-designed smokehood having a concealed sliding damper which provides for improved draught control with fine adjustment for low burning rate. A permanent secondary air inlet is concealed in the one-piece front plate directly under the overhang of the top plate casting.

The attractively styled drop front fire door, fitted with a full size cast-iron protective baffle, is held by

concealed hinges. A loose baffle plate is also fitted under the front bar which, in addition to deflecting the ash, forms an air cooling passage for the further protection of the enamel on the front of the boiler directly below the fire door. The charging lid has been increased in size and is shaped to take a shovel to make refuelling a more simple and cleaner operation. This Boiler has a rating of 20,000 B.T.U.'s per hour and is suitable for use with hot water storage tanks of 25-30 gallon capacity. It is available in either Grey or Cream mottle enamel finish.

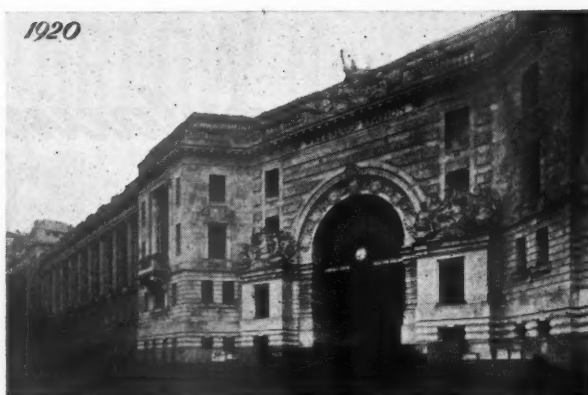
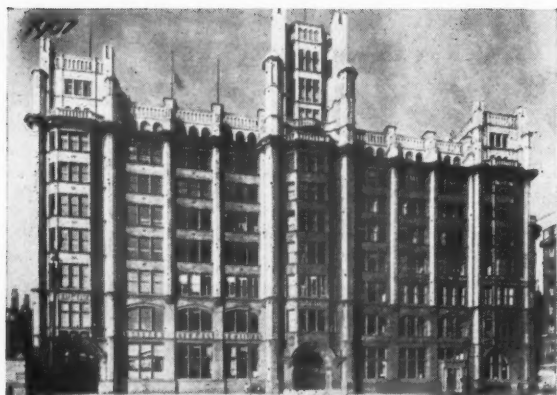
The Ideal No. O-DE embodies over 50 years' experience in the manufacture of domestic boilers and represents the best value in small Domestic Boilers on the market.

Designed and built by the originators of the Domestic Boiler



327A

IDEAL BOILERS & RADIATORS LIMITED · IDEAL WORKS · HULL



50 years of Service to Building

In this, our Jubilee year, we turn back the pages and remind our friends of some of the many thousands of well-known buildings in which Kleine Floors have been incorporated since 1905.

The four we have chosen to illustrate are:—

Tower Buildings, Liverpool, 1907: *Architect, the late W. Aubrey Thomas.*

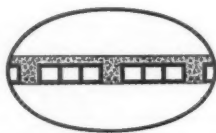
Offices, Waterloo Station, London, 1920: *Architect, the Chief Engineer, London and South Western Railway.*

Shakespeare Memorial Theatre, Stratford-on-Avon, 1932: *Architects, Scott, Chesterton, and Shepherd.*

Administration Block, Esso Refinery, Fawley, 1953: *Architects, Lanchester and Lodge, F.F./R.I.B.A.*

Half a century of specialising exclusively in design and construction confirms our belief that the hollow-tile system, introduced by us into this country in 1905, remains the best.

THE KLEINE CO. LTD.



Established 1905

THE KLEINE COMPANY LTD., 9-13 GEORGE STREET, MANCHESTER SQ., LONDON, W.1: WELBECK 9131
and at BIRMINGHAM, MANCHESTER, NEWCASTLE, BRISTOL, SOUTHAMPTON & GLASGOW

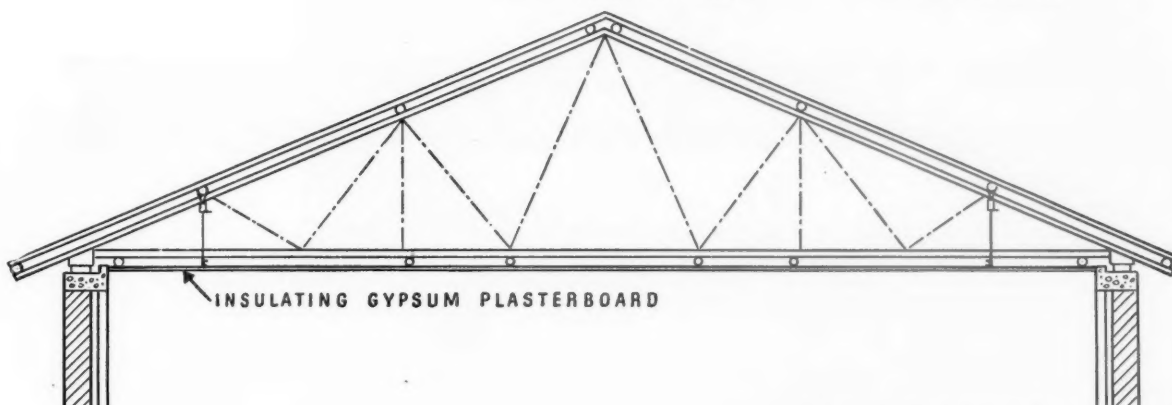
Thermal Insulation of HOSPITALS . . .

Example: Job No. IC.907

Construction: Asbestos cement sheeting, building paper over horizontal tubular steel purlins, suspended Insulating Gypsum Plasterboard ceiling.

SUSPENDED CEILING

Area	1,263 sq. yds.
Contract Cost (erected)	16/6d. per sq. yd.
'U' value (roof only)	1.4
'U' value (roof and ceiling lining)	0.25
Flame Spread Rating	Class 1 (B.S.476)



Whatever the building, fire hazard must be minimised. Gypsum plasterboard is fire-resisting to a higher degree than any other board of comparable cost.

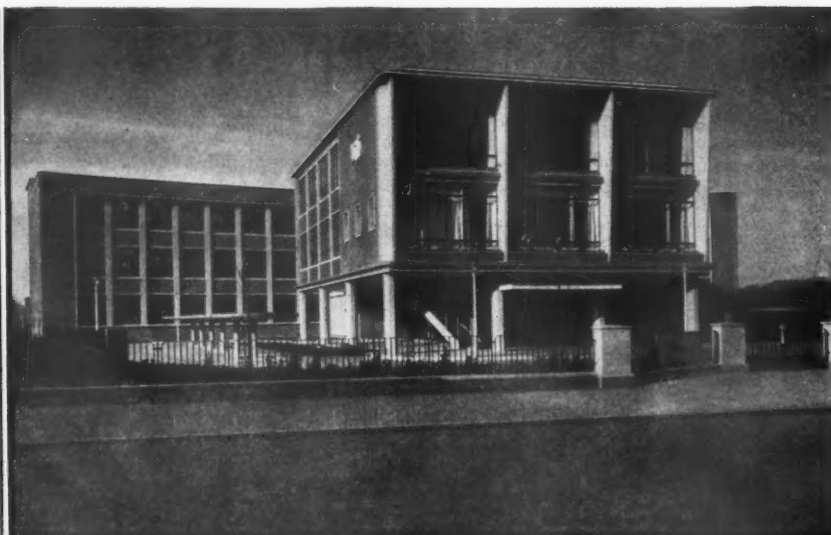
INSULATING GYPSUM PLASTERBOARD
gives the essential degree of thermal insulation
with FIRE protection at lowest cost.

For information and literature please write to one of these addresses :



PLASTER PRODUCTS (GREENHITHE) LIMITED, GREENHITHE, KENT Greenhithe 2251/5
THE BRITISH PLASTER BOARD (MANUFACTURING) LIMITED, BATH HOUSE, 82 PICCADILLY, W.1 Grosvenor 7050
IMPERIAL CHEMICAL INDUSTRIES LIMITED, MILLBANK, LONDON, S.W.1 Victoria 4444
GYPROC PRODUCTS LIMITED, WESTFIELD, UPPER SINGLEWELL ROAD, GRAVESEND, KENT Gravesend 4251
Published by The Gypsum Building Products Association

G14



Portsmouth Technical College studies comfort



Entrance Hall, heated entirely by panel coils embedded in the false ceiling.

The Portsmouth Technical College is heated by means of embedded panel coils in the ceilings, radiator panels in wall recesses and hospital type radiators.

The radiator systems receive hot water direct from cast-iron sectional boilers, which also supply the calorifiers feeding the embedded panels.

Building designed under the supervision of the City Architect, F. Mellor, Esq., F.R.I.B.A., engineering services installed by Brightside to the specification of H. A. Sandford, Esq., M.A., F.G.S., M.I.Mech.E., M.I.E.E., M.I.H.V.E., M.Cons.E.

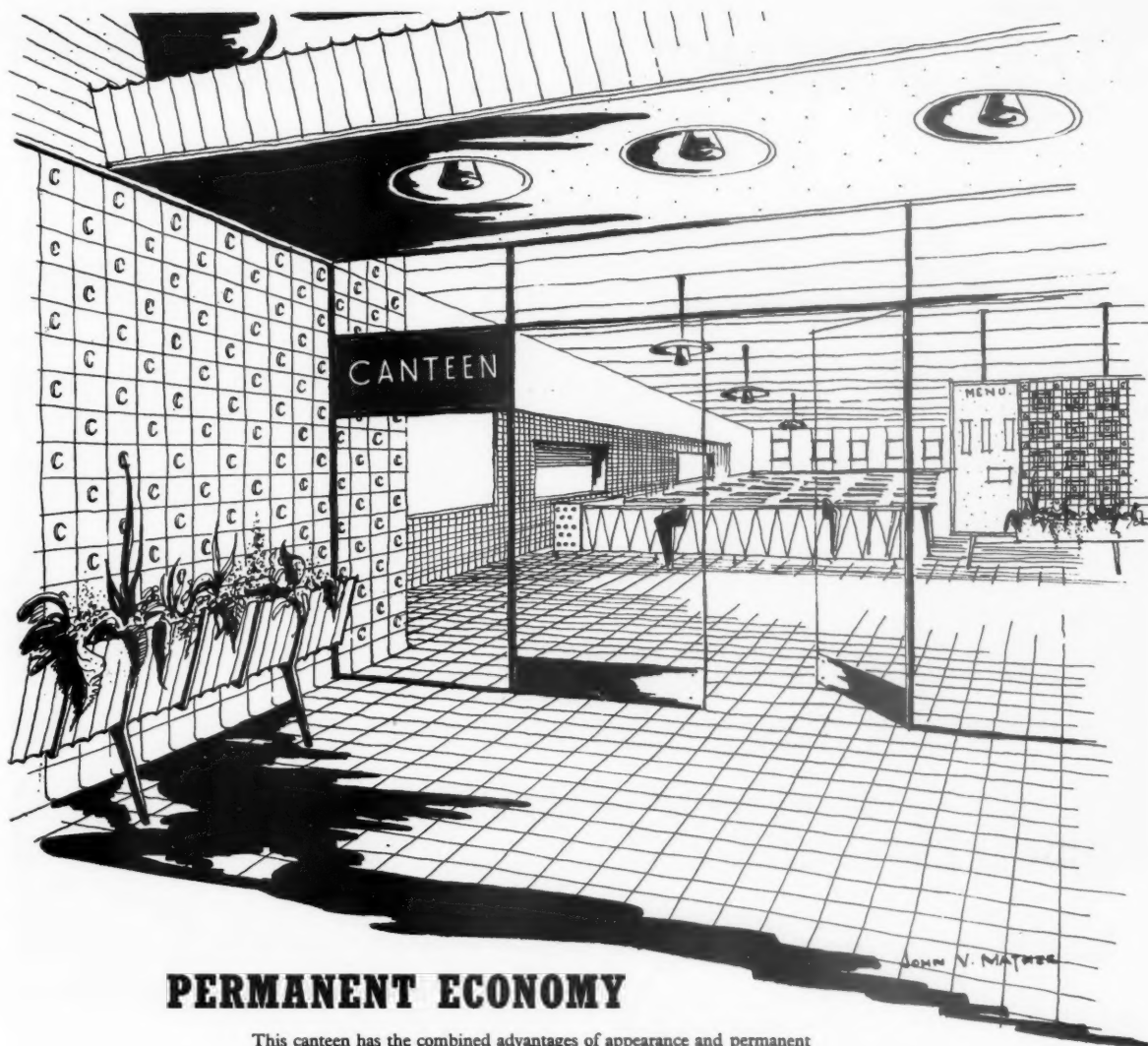
BRIGHTSIDE

BRIGHTSIDE HEATING & ENGINEERING CO. LTD. SHEFFIELD

(A subsidiary of The Brightside Foundry & Engineering Co. Ltd.)

Belfast . Birmingham . Bradford . Bristol . Edinburgh . Glasgow . Liverpool . London . Manchester . Newcastle . Portsmouth

BP 54



PERMANENT ECONOMY

This canteen has the combined advantages of appearance and permanent economy. Ceramic Floor Tiles withstand continuous heavy usage without deteriorating. Walls and fascias in restful hues extend a relaxing invitation to employees, lift hygiene to its highest plane, eliminate maintenance and cut cleaning time to the minimum. There is no substitute for the versatility of application, colour range and permanence of modern Ceramic Tiles.

Ceramic

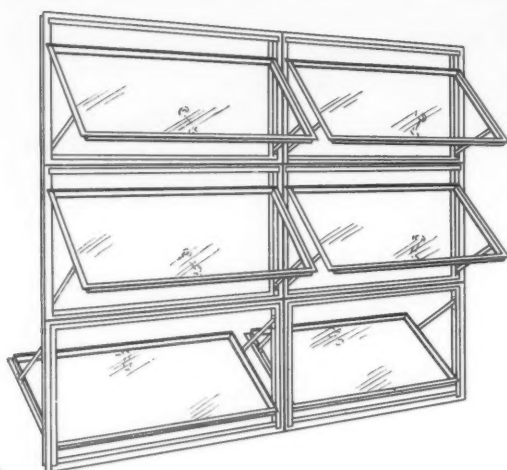
T I L E S

Glazed & Floor Tile Manufacturers' Association · Federation House · Stoke-on-Trent

STEEL WINDOWS *by* BEACON



A recent installation in Panama



Beacon rustproofed steel windows are built to last—and last. Due to their precision welded construction they remain dimensionally unaffected by extreme climatic changes, whilst their high standard of quality substantially reduces maintenance costs. All Beacon Windows are scientifically designed to provide maximum light with controlled draught-proof ventilation. We invite Architects and Builders to make the fullest use of the wide experience gained by our Design staff and our representatives in the field.



Member of the  Metal Window Association

JOHN THOMPSON BEACON WINDOWS LTD • WOLVERHAMPTON

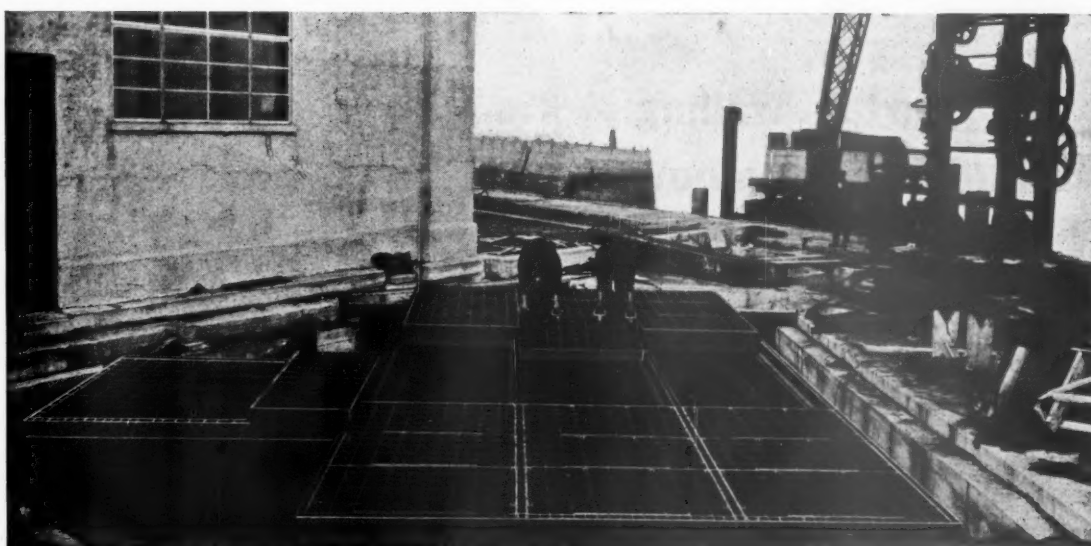
ELKINGTON GATIC

REGD. T.M.

COVERS AND FRAMES FOR ALL PURPOSES

PATENTED THROUGHOUT THE WORLD

HEAVY DUTY NON-ROCKING AND WATERTIGHT MULTI-PART COVERS AND FRAMES



Elkington-Gatic Multi-part covers can be made to cover any area. Steel removable joists, housed in either cast iron flush type or steel wall boxes, according to whether the frames are bedded on concrete or steel foundations, are provided to support all the covers.

Elkington Gatic Covers can be supplied in any size to suit any loadings. The design is such that the cover and frame seatings are in metal to metal contact with the result that under traffic the cover is immovable. For further details write to:—

THE DOVER ENGINEERING WORKS LTD

Registered Offices

DOVER KENT

Telephone 545 & 1449

Telegrams **ENGINES, DOVER**



Sales and Enquiries

68 Victoria Street

Westminster London S.W.1

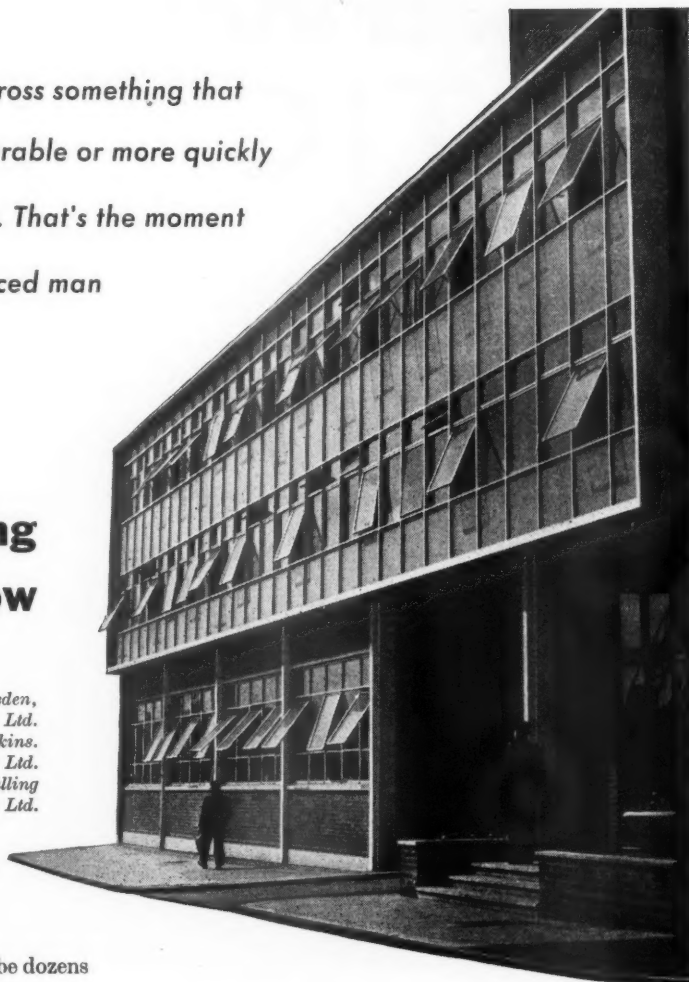
Whitehall 2250

CITAG SOWEST LONDON

Sooner or later you will come across something that
could be made lighter, more durable or more quickly
and economically in aluminium. That's the moment
to talk it over with an experienced man
from Northern Aluminium*

Curtain walling takes a bow

*New Office Block, Atlas Road, Willesden,
built for Messrs. T. Wall & Sons Ltd.
Architects: J. Stanley Beard, Bennett and Wilkins.
Contractors: Sir Robert McAlpine & Sons Ltd.
Sub-Contractors for curtain walling
and windows: Williams & Williams Ltd.*



This is one of the first. But soon there will be dozens more—buildings erected faster and more efficiently by the new-technique of curtain walling.

A reinforced concrete framework carries the building's weight and the weather is kept out by the curtain walling. Set in a framework of Noral alloys, the panels of this curtain walling consist of 2 glass panes with a sealed air space in between and a backing of insulating material. The infilling panels are only 1½ inches thick; they thus increase the

available floorspace effectively while retaining as much or more heat than a cavity brick wall.

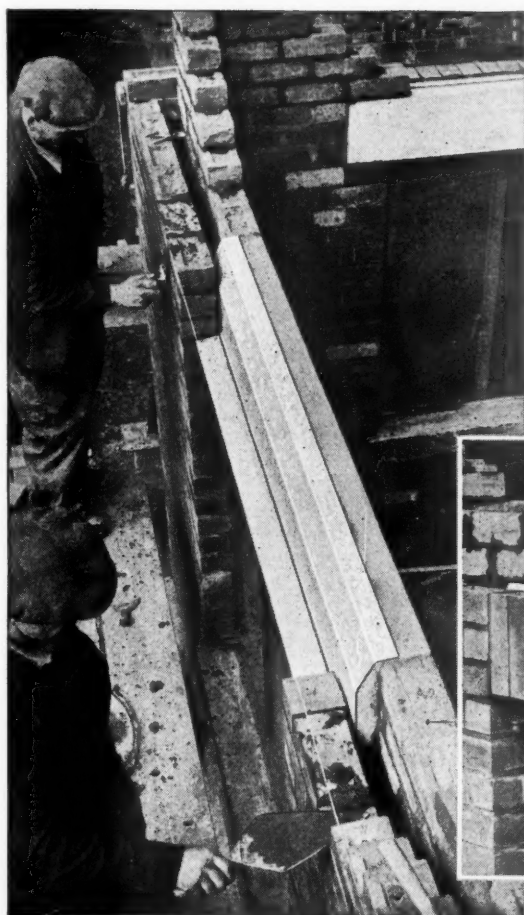
Curtain walling depends a great deal for its success on aluminium alloys. Because they combine lightness with structural strength, durability with attractiveness, they are ideal as a building material. In architecture as in other fields aluminium is always making new advances possible.

** If you think we could help with advice or technical assistance,
write to our Sales Development Division, Banbury, Oxon.*

Northern Aluminium
C O M P A N Y L I M I T E D

An ALUMINIUM LIMITED Company



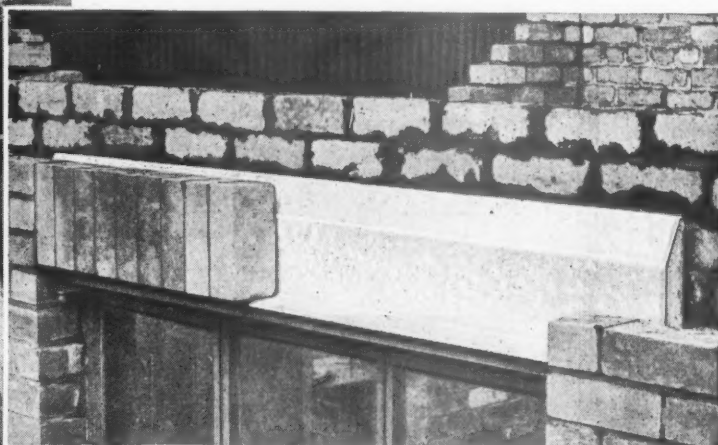
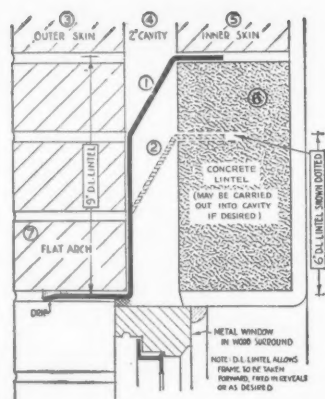


SECTION SHOWING TYPICAL DETAIL

- (1) 9 in. Dorman Long Lintel
- (2) 6 in. Dorman Long Lintel (shown dotted)
- (3) Outer skin
- (4) Cavity
- (5) Inner skin
- (6) Inside concrete lintel (carried out into cavity if so desired)
- (7) Flat arch

The wide 'turn-in' of the Dorman Long Lintel allows the cavity to be varied from 2 in. to 2½ in. in width.

Patent No. 694214



THE DORMAN LONG LINTEL

Combined Angle Arch Support & Dampcourse Tray
IN HOT-DIP GALVANIZED STEEL, FOR USE AT THE
HEADS OF OPENINGS IN EXTERNAL CAVITY WALLS

Comes on site to required length ready to fix.

Large saving in site labour costs.

Cannot be damaged in cavity cleaning.

THE DORMAN LONG LINTEL has only to be placed into position over the head of the opening, and without delay the work carries on.

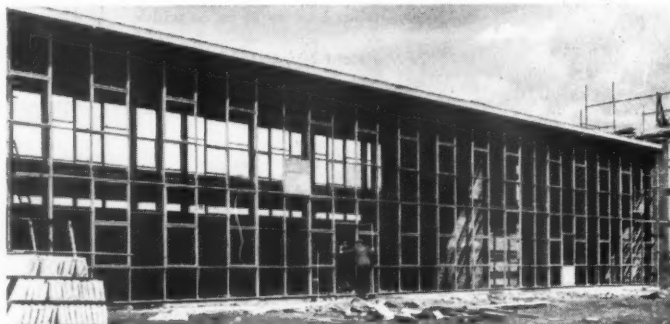
Prices and details from:

DORMAN LONG (Steel) LTD., Sheet Dept., Middlesbrough
or from district offices at London, Birmingham, Manchester,
Newcastle, Belfast, Glasgow.

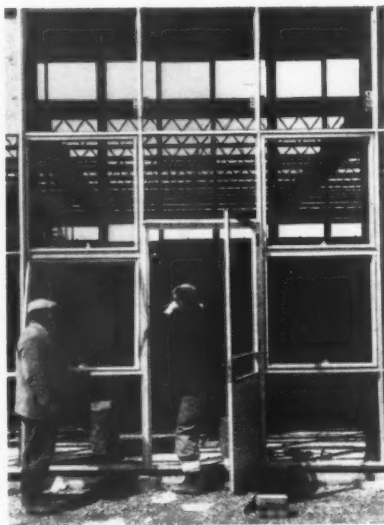
DORMAN LONG

WINDOGRID

Curtain Walling



BRANDHALL COUNTY PRIMARY SCHOOL, OLDBURY



*L. C. Lomas, F.R.I.B.A.
County Architect for Worcestershire*

ANOTHER SCHOOL WHERE
THE ENTIRE FAÇADE OVER
100 FT. LONG IS CLOTHED
IN HOPE'S WINDOGRID.
INSULATING PANELS WILL
MASK THE FLOOR LINE, GIV-
ING A PATTERNED SURFACE
TO THE WHOLE ELEVATION

Send for List 295

HENRY HOPE & SONS LTD

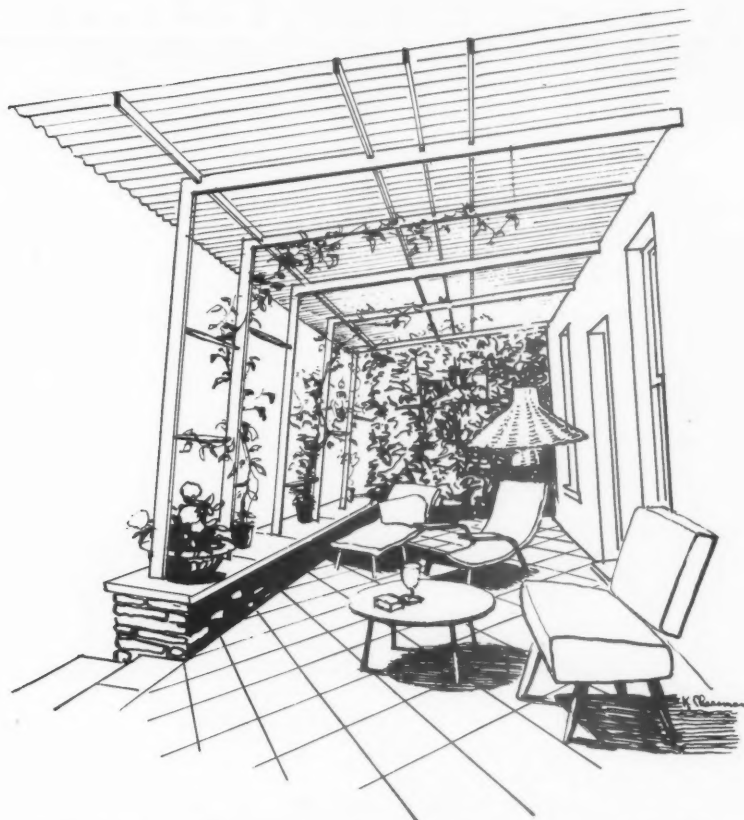
Smethwick, Birmingham & 17 Berners St., London, W.1

MEMBER OF THE METAL



WINDOW ASSOCIATION

that's
a
light
idea
(No 1)



UNDULITE, the translucent building material, cuts costs because it's lighter

A fresh-air annexe to the living room is a luxury idea—but UNDULITE cuts the cost to a practical level! UNDULITE is a translucent corrugated plastic sheeting, reinforced with fibreglass. It's so light and easy to handle that man-hours are cut to a minimum and the simplest framework gives adequate support.

UNDULITE and a little imagination will provide an effective answer to hundreds of building problems. It's tremendously strong, rigid, durable and shatterproof. Use it for roofing, skylights, wall lights, panels and partitions. Use it to let the daylight into farm buildings, factories, shops and office buildings.

light, strong and easy to handle—

UNDULITE

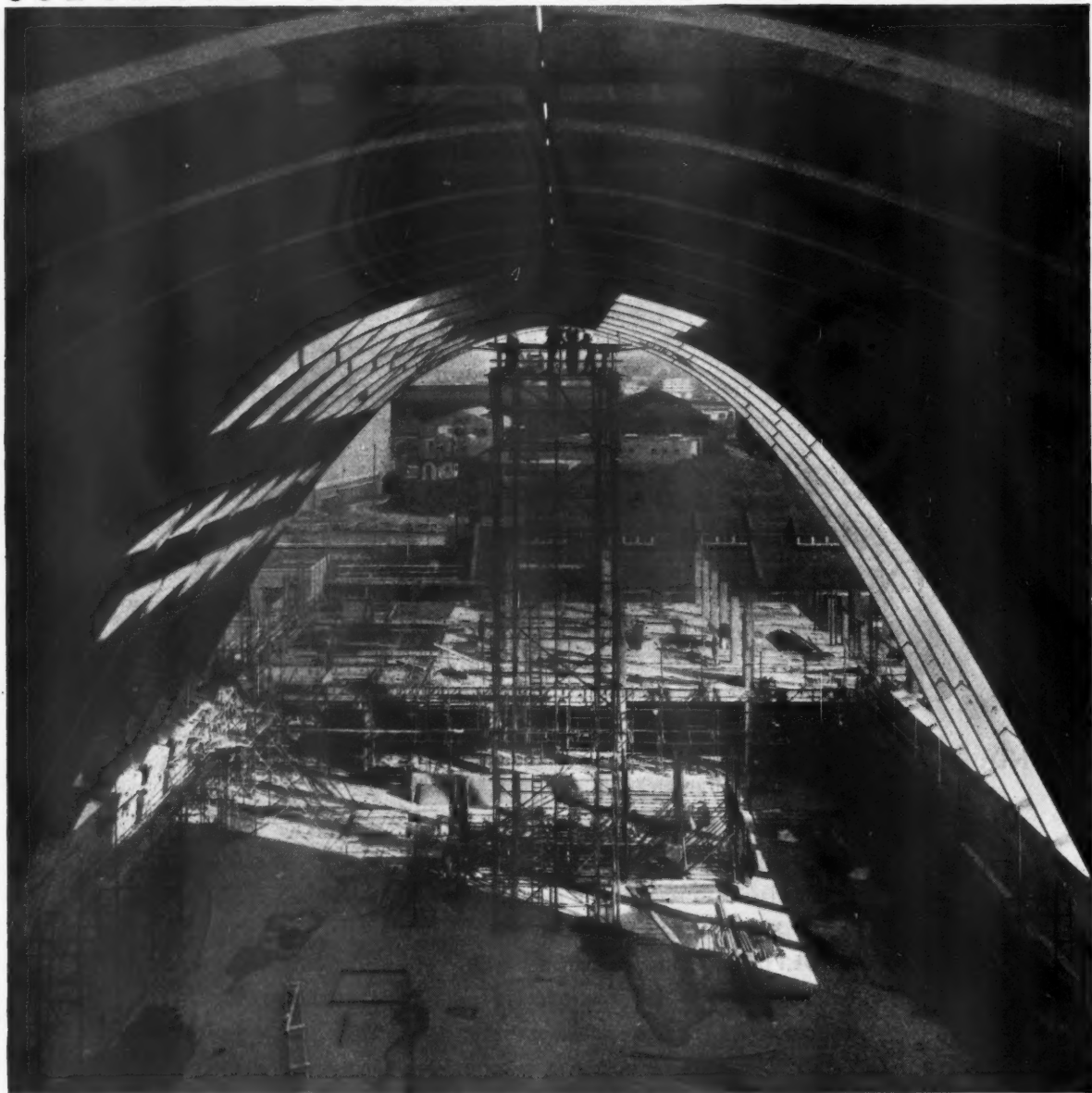
made by **Ashdowns**

ASHDOWNS LIMITED, ECCLESTON WORKS, ST. HELENS, LANCs. TELEPHONE: ST. HELENS 3206

UNDULITE is made in standard sized sheets to nest with standard pitches of other materials, and it can be cut, sawn, drilled, clipped or even nailed with ordinary tools to suit your particular requirements. For further details, please write for a copy of our illustrated folder. Delivery of standard profiles ex. stock.

Ashdowns Limited is a subsidiary of Pilkington Brothers Limited

CONCRETE CONTRIBUTIONS BY TWISTEEL



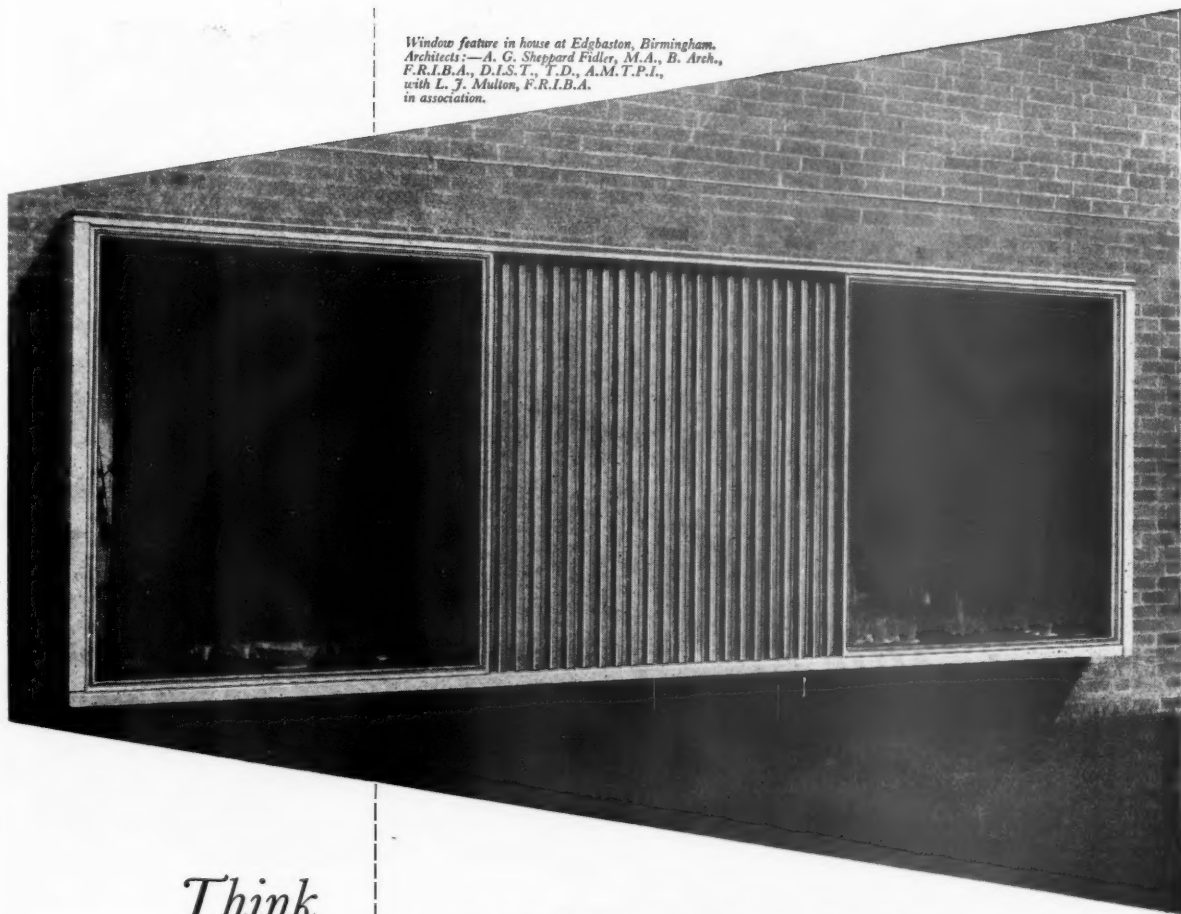
*Sulphate Store and Bagging Plant, Phoenix Wharf, East Greenwich. Designed in conjunction with: Engineers of South Eastern Gas Board.
Contractors: Demolition & Construction Co. Ltd.*

To make sure of the highest standards in concrete design and construction, at the lowest cost in steel, money and time, call in the TWISTEEL Design Service. Their specialist knowledge, backed by many years of practical experience, enables them to advise architects and engineers, with certainty, on every aspect of design and planning for every type of construction involving the use of reinforced concrete: and they can also supply the reinforcement.

TWISTEEL DESIGN SERVICE

43 UPPER GROSVENOR STREET, LONDON, W.1. • TELEPHONE: GROSVENOR 1216
AND AT BIRMINGHAM MANCHESTER GLASGOW

Window feature in house at Edgbaston, Birmingham.
Architects:—A. G. Sheppard Fidler, M.A., B. Arch.,
F.R.I.B.A., D.I.S.T., T.D., A.M.T.P.I.,
with L. J. Multon, F.R.I.B.A.
in association.



Think of a Window

... and give distinction to your design by framing your thoughts in wood. Whether for windows of modern or traditional style, wood is best. No other material has the same beauty and character, or lends itself to such individuality in design. Wood follows your design as your pencil follows your thoughts. It is easily worked, shaped, curved, moulded or carved. Wood windows fit snugly, are kind to glass, and there are many suitable woods to choose from. For character on the face of a window ...



... there's nothing like **WOOD**

ISSUED BY

THE TIMBER DEVELOPMENT ASSOCIATION LIMITED • 21 COLLEGE HILL • LONDON • E.C.4
and branches throughout the country

TGA YD87



*Work can
be a pleasure!*

In the garden it's quiet. If the machine shop was as peaceful, nobody would have that "Monday-morning" feeling all the week. The thundering machinery, the whine as metal bites into metal, the overwhelming din, strains nerves to breaking pitch and encourages the 'odd day off'. Something must be done about it—call in Cullum. Cullum's acoustic engineers reduce noise and restore sounds to a tolerable level. Cullum *ought* to be called in straight away.

Sound control by

CULLUM

THE ACOUSTIC CONSULTANTS AND CONTRACTORS

Concessionnaires for

ACOUSTI-CELOTEX



PROGRESS WITH QUIETNESS

HORACE W. CULLUM & CO. LTD., FLOWERS MEWS, LONDON, N.19 Tel: ARC 2662 (4 lines)

19 years hard-wearing service

AND GOOD FOR MANY MORE!

19 years ago Perstorp Panels were fitted in the refreshment room of Stockholm's main railway station. They remain in perfect condition today! Here is a tough, super-hard plastic laminate that is ideal on all surfaces where the need is for durability and beauty. Now available in a wider colour range than ever before, with an exquisite finish half-way between matt and gloss, Perstorp Panels offer splendid scope for imaginative decorating schemes. *Yet they cost no more than any other comparable product.* Readily cut and trimmed on site, Perstorp Panels are fitted with ease and speed. For domestic, commercial and industrial building, versatile Perstorp Panels are being specified by an ever-growing number of architects.



HOMES. Easy-to-clean Perstorp Panels brighten every room. "Locked-in" colours never fade. Complete hygiene in bathroom and kitchen assured.

SHOPS. Hygienic Perstorp Panels make immense savings on cleaning and maintenance costs. Will not crack or chip. Keep interiors smart and businesslike.



CANTEENS. Super-hard Perstorp Panels present an impenetrable front to dirt and germs. Take any amount of hard knocks yet remain glass-smooth.

BARS. Bar counters and tabletops look at their best surfaced with Perstorp Panels. A damp cloth quickly erases all stains.



PERSTORP PANELS

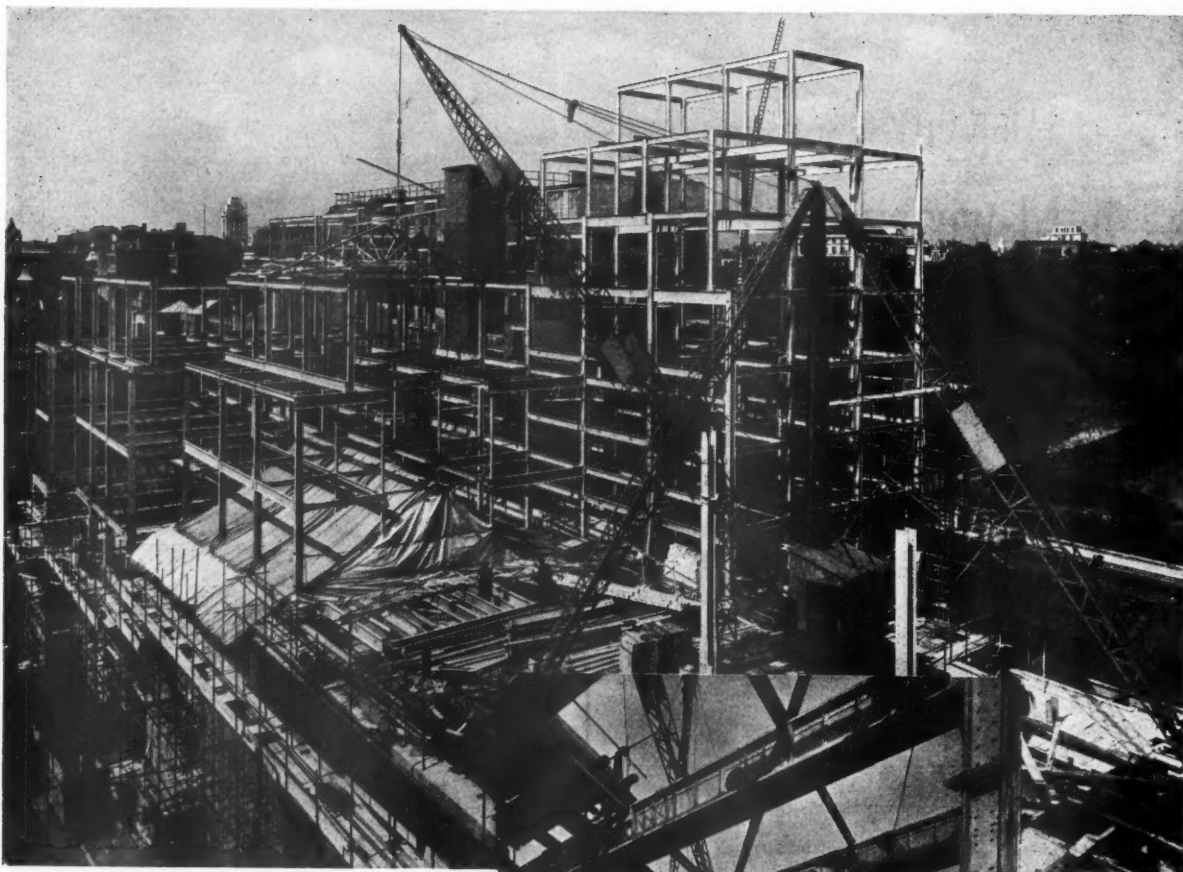
Made in Sweden and sold throughout the world by

SKANSKA ATTIKFABRIKEN AB • PERSTORP (SWEDEN)

The leading plastic laminate manufacturers of Scandinavia for over 27 years.

LOOK FOR THIS LABEL! YOUR GUARANTEE OF HIGH QUALITY

All enquiries to agents for the U.K.: C. F. ANDERSON & SON LTD., Harris Wharf, Graham Street, London, N.1. CLErkenwell 4582. GEO. E. GRAY LTD., Joinant House, Eastern Avenue, Ilford, Essex. VALEntine 2211. HEATON TABB & CO., LTD., 55 Bold Street, Liverpool, 1. ROYal 3457. RUDDERS & PAYNES LTD., Chester Street, Aston, Birmingham, 6. ASTon Cross 3071. A. J. WARES LTD., King Street, South Shields, South Shields 2380.



**ROYAL COLLEGE
OF SURGEONS
OF ENGLAND**

Lincoln's Inn Fields
London, W.C.2

Architect:

Alder W. Hall, M.C., F.R.I.B.A.,
of Young & Hall

Consulting Engineer:

Oscar Faber, C.B.E., D.C.L. (Hon.),
D.Sc., M.I.C.E., P.P.I.STRUCT.E.

Contractors:

Humphreys Ltd.



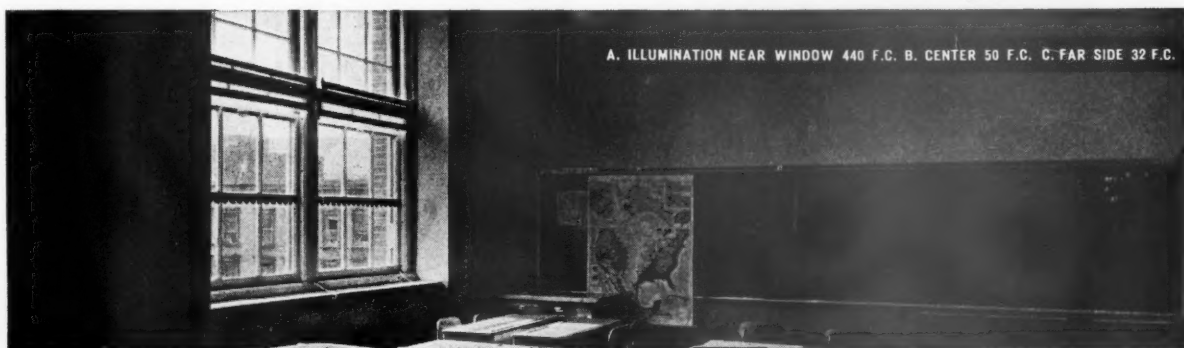
STEELWORK BY
REDPATH BROWN

LONDON OFFICE: 3 DUNCANNON STREET, LONDON, W.C.2

You get **34.4%** more light

With Venetian Blinds of

Luxaflex



Bare window wastes light.... leaves far side dark



LUXAFLEX blind spreads light to far side of room

An exhaustive study by the Faber Birren Company* shows: A bare window gives extreme glare on one side of the room, insufficient light on the other. The Luxaflex Blind, by reflection, *spreads* the high-intensity sunlight at the window throughout the room - giving more illumination with less glare. The brightness ratio, which was 14 to 1 with the bare window, is now reduced to a comfortable 4 to 1.

Write for additional information and the name and address of a venetian blind manufacturer using Luxaflex slats and tapes to

Only LUXAFLEX blind-materials give these maintenance and durability advantages:



Easy cleaning

A damp cloth wipes away even the most stubborn stains from LUXAFLEX aluminium slats and vinyl plastic tapes. The tapes always keep their freshness - never stretch, shrink or discolour.



Snap-back

aluminium slats
Now available in 14 beautiful pastel colours. Dura-tised to snap back ruler-straight, even when bent to a 90° angle. Baked-on finish can't rust, chip, crack or discolour.



Look for this mark

Be sure the blinds you specify carry the Luxaflex "visible-invisible" trademark on the slats. It's your guarantee of unrivalled quality.

HUNTER DOUGLAS (GREAT BRITAIN) LTD., 10 DRAKE STREET, RED LION SQUARE, LONDON W.C. 1



See-

HOW THE SCENE CHANGES

Garage with conventional lighting. Note the confusion of beams, pipes, trunking, wiring and light fittings.

The same garage after modernising with a LUMENATED CEILING.



Write for your copy of "LUMENATED CEILINGS", an illustrated brochure giving full details of this new lighting technique.

When modernising old premises or building new ones, you can make lighting an integral part of design by installing a LUMENATED CEILING, a new lighting technique combining light source and ceiling in one. The whole interior of shops, offices and show-rooms is diffused with a pleasant, efficient light of uniform intensity without shadow, glare or 'high spots'. The LUMENATED CEILING overcomes many design problems

by effectively screening overhead pipe work, ventilation trunking and other unsightly projections.

SAVING IN MAINTENANCE COSTS

The surface of the LUMENATED CEILING is a durable, finely corrugated plastic material, specially treated to repel dust. It is non-inflammable, can be easily cleaned and kept in perfect condition with the minimum of attention.

LUMENATED CEILINGS LIMITED

LONDON OFFICE: 4 LLOYDS AVENUE, E.C.3. TEL: ROYAL 1927

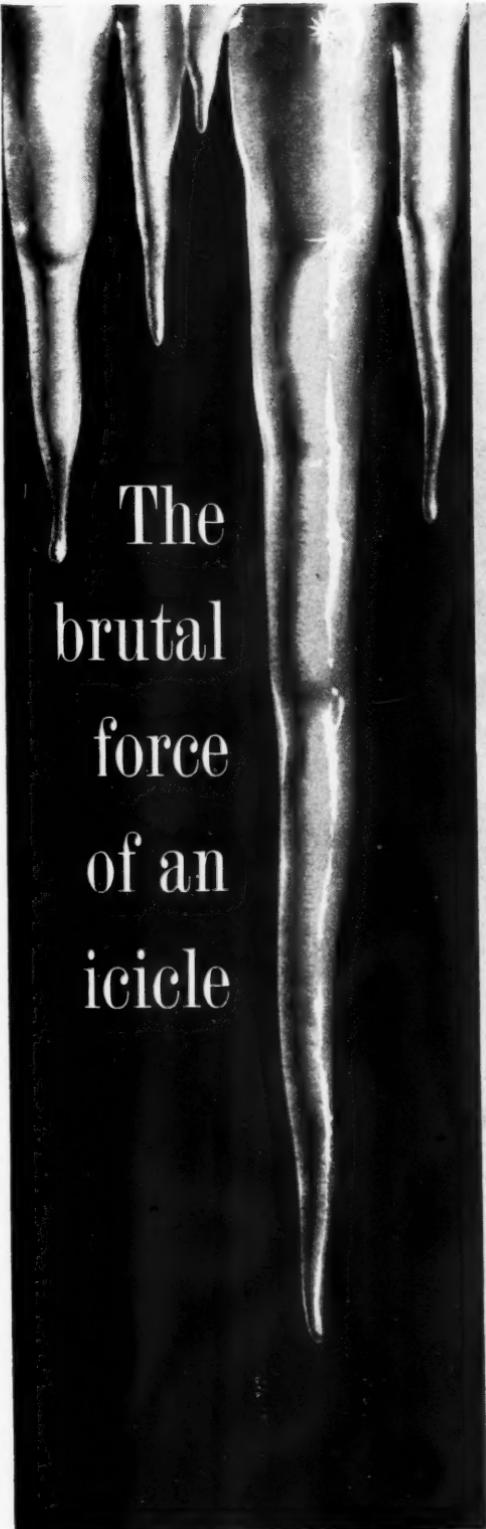
HEAD OFFICE: THERMOTANK LTD., HELEN STREET, GLASGOW

South African Company: Thermotank S.A. (Pty.) Ltd., Simmonds & Godfrey Street, Johannesburg.



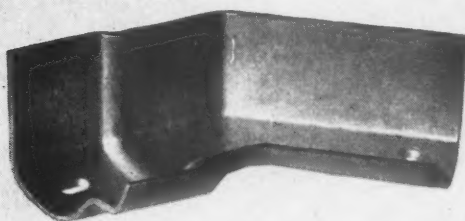
TGA L7





The
brutal
force
of an
icicle

The forming of ice and the contraction of metal in cold weather, can cause rainwater pipes and fittings to burst. The strength and ductility of 'Hiduminium' Rainwater goods will resist this force of nature to the utmost degree, and they are light to handle and easy to fix.



Hiduminium
Regd. Trade Mark
Rainwater
Goods

HIGH
MANUFACTURED BY **DUTY LTD.**
ALLOYS

SLOUGH · BUCKS · TEL : SLOUGH 23901.



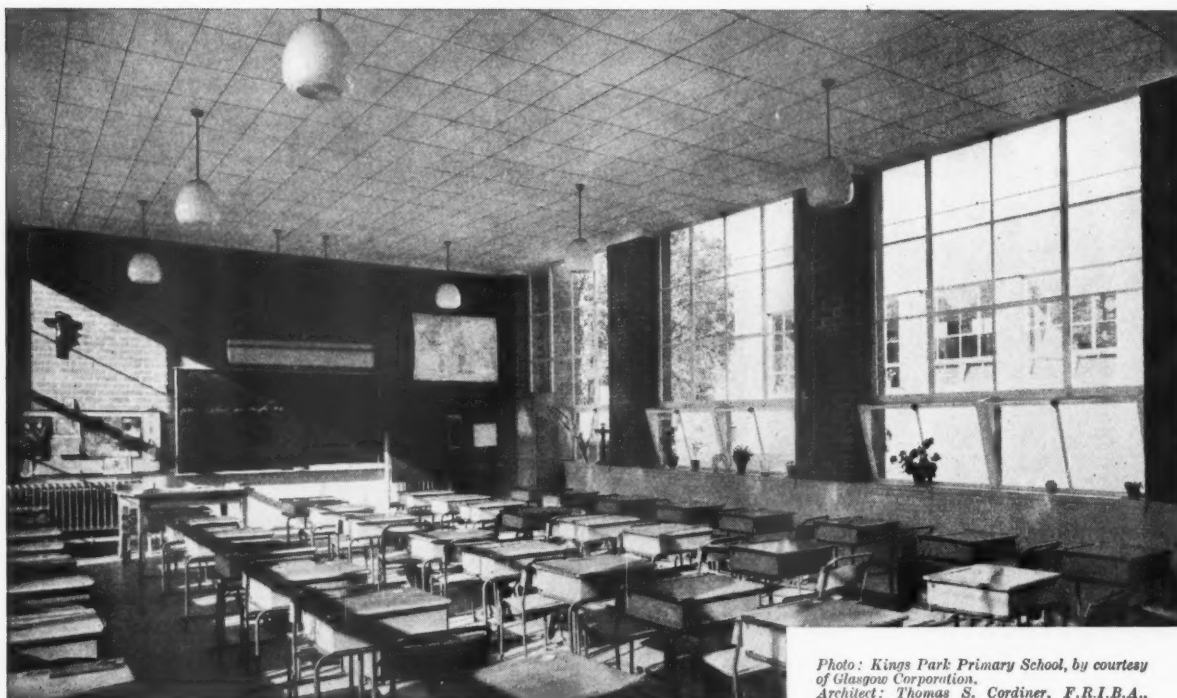


Photo: Kings Park Primary School, by courtesy of Glasgow Corporation.
Architect: Thomas S. Cordiner, F.R.I.B.A., Glasgow, C.S.

Quiet thought

brings the right answer

'What's the capital of Abyssinia?' 'Addis Ababa, Sir', says Smith Minor promptly. Note how easily he hears and how there's no distracting noise to prevent him giving the right answer. It means that his classroom, like the one illustrated here, is planned to *eliminate unnecessary noise*. Classrooms which are acoustically correct make for easier and better concentration with less wear and

tear on the nerves of both staff and pupils. That's why in schools and colleges all over the world you'll find Acousti-Celotex sound absorbing tiles. They are easily and inexpensively installed and their effect is *permanent* as they can be repainted as often as necessary without impairing their effect. If you have a sound problem consult your regional Acousti-Celotex Distributor.

ACOUSTI-CELOTEX SOUND ABSORBING TILES

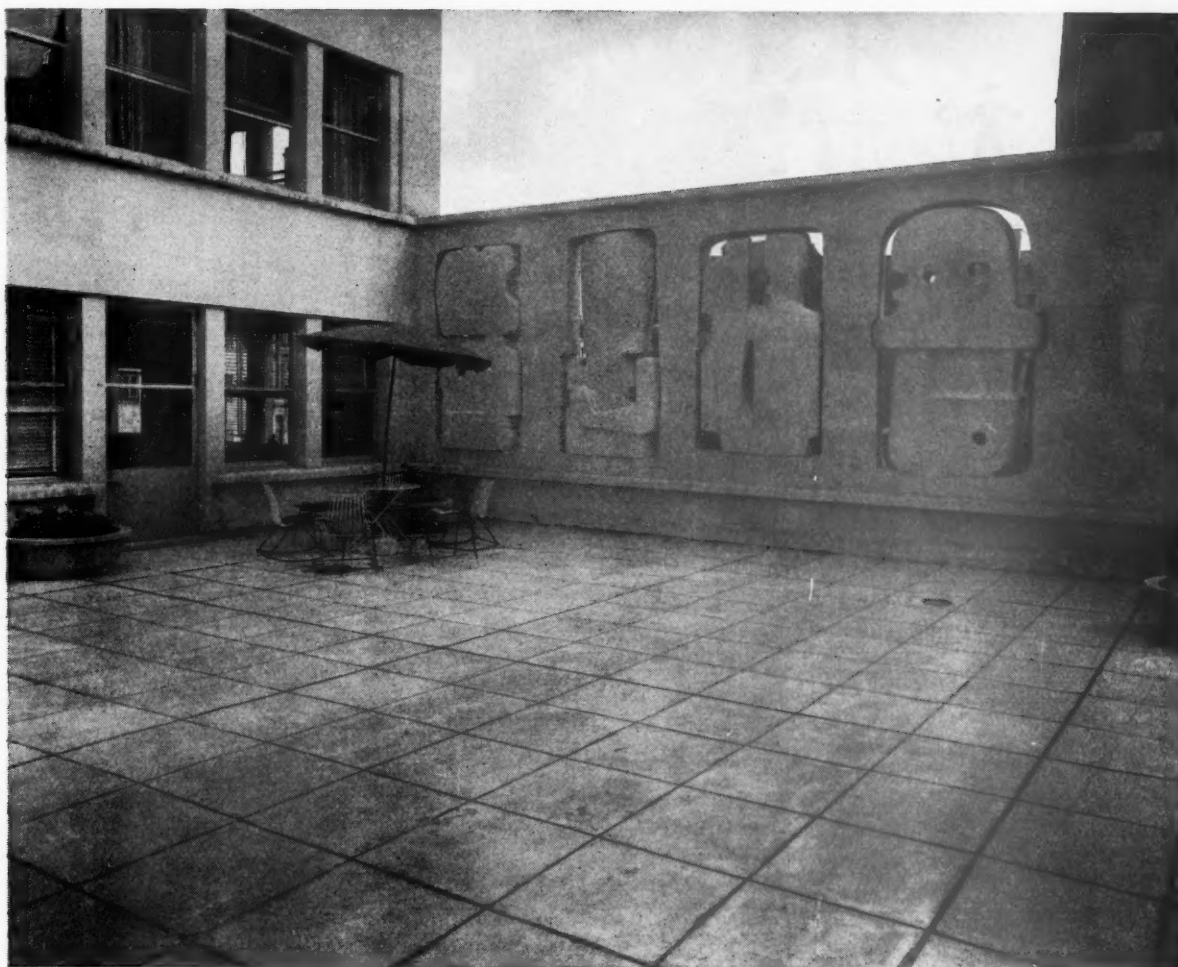
ANOTHER
CELOTEX CANE FIBRE
PRODUCT

★ Distributors for London, Southern Counties, Wales, the Midlands and Yorkshire
HORACE W. CULLUM & CO. LIMITED
8-9 Flowers Mews, London, N.19. Tel: ARC 2662
Distributors for Scotland and Northern Counties
WILLIAM BEARDMORE & COMPANY LTD.
Parkhead Steel Works, Glasgow. Tel: Bridgeton 1881



MADE IN GREAT BRITAIN BY CELOTEX LIMITED, N. CIRCULAR RD., STONEBRIDGE PARK, LONDON, N.W.10

TELEPHONE: ELGAR 5717 (10 LINES)



Architect: Michael Rosenauer, F.R.I.B.A.

Contractor: Holland & Hannen and Cubitts Ltd.

PAROPA roofs new "TIME-LIFE" building

PAROPA *Regd.* was supplied for the roof of the new "Time-Life" building erected in New Bond Street, W.1. Chosen for its attractiveness, permanence and non-slip qualities, PAROPA by Frazzi is ideal for all roofing requirements, terraces, forecourts and swimming-pool surrounds.

PAROPA is laid *in situ* to any size, shape or angle—as curbs, mitres or skirting—to any wood, brick or concrete surface.

Always insist on genuine PAROPA by Frazzi—the original and best.

FIRE-RESISTING FLOORS AND ROOFS

For over forty years Frazzi have specialised in the execution of all types of constructional fire- and sound-resisting floors and roofs. Your enquiries are invited.

FRAZZI LIMITED SPECIALISTS IN ROOF AND FLOOR CONSTRUCTION

LENNOX HOUSE, NORFOLK STREET, STRAND, W.C.2
Also at Dutton Road, Sheffield, 6.

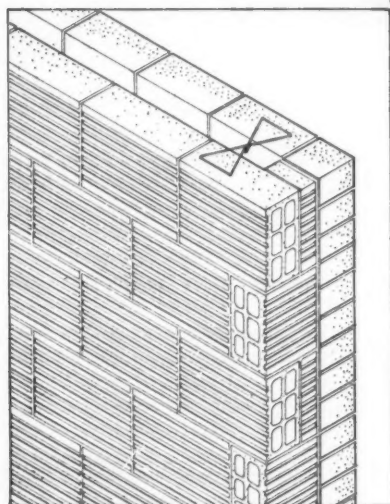
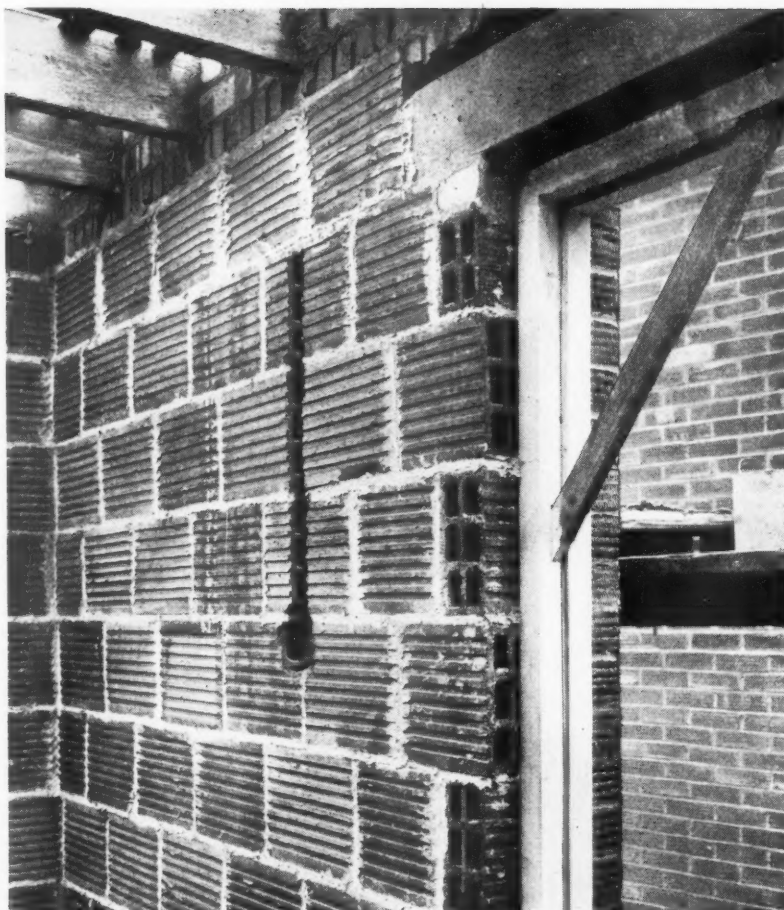
Telephone: Temple Bar 5371
Telephone: Sheffield 44798

AGENTS: Robert Kirk Ltd., Exchange Street, Belfast; J. & W. Henderson Ltd., 10 Claremont Terrace, Glasgow, C.3.
Murphy Bros., 3 Castlewood Avenue, Dublin, Ireland.



*At the service of
modern building*

4 inch 'PHORPRES'
HOLLOW CLAY BUILDING BLOCKS
used in conjunction with
'PHORPRES'
RUSTIC FACINGS
and
KEYED COMMONS



Specify and use

'PHORPRES' BUILDING BLOCKS
with

'PHORPRES' FACINGS and COMMONS

for walling of:

LOW COST • GOOD THERMAL INSULATION • SPEEDY ERECTION
LIGHT CONSTRUCTION • IDEAL BACKING FOR PLASTER

LONDON BRICK COMPANY LIMITED

Midland District Office:
Prudential Buildings, St. Phillip's Place, Birmingham. 3
Colmore 4141.

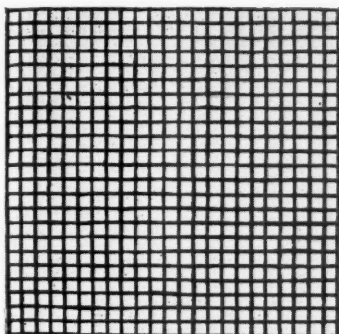
South-Western District Office:
11 Orchard St., Bristol, 1
Bristol 2300415

Northern District Office:
St. Paul's House, 20-22 St. Paul's Street, Leeds
Leeds 20771.

Head Office: AFRICA HOUSE, KINGSWAY, LONDON, W.C.2 Holborn 8282.

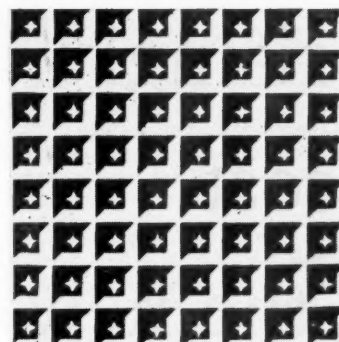
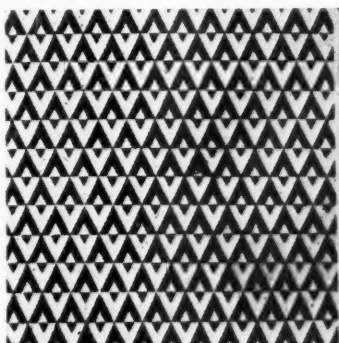


BY APPOINTMENT
TO HER MAJESTY QUEEN ELIZABETH II
BRICK MAKERS



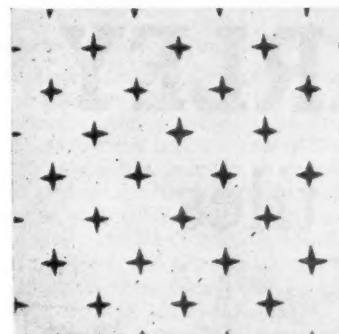
PR 106 ABOVE

PR 107 BELOW



PR 98 ABOVE

PR 109 BELOW



Of the many standard patterns that are available in two or more colours, four are shown above. Any combination of 28 special colours can be supplied. These are described in Carter Booklet 49 which will be sent on request.

CARTER

Handprinted Tiles

are contributing to fine architecture throughout the world

OVERSEAS AGENTS:

AFRICAN CONTINENT

CAPE PROVINCE & SOUTH AFRICA: Leo Raphaely & Sons, P.O. Box 447, Cape Town.

EGYPT: Felix Argy, P.O. Box 1046, Alexandria.

KENYA, TANGANYIKA & UGANDA: P. N. Flatt, P.O. Box 228, Nairobi.

MAURITIUS: Port-Louis General Stores, Port Louis, Mauritius.

NATAL: M. Beit & Co., Bigden House, 505 Smith St., Durban.

PORTUGUESE EAST AFRICA: Emil Abegg, Rua Arenjo. Nos. 116-120 (Postal 78), Lourenco Marques.

TRANSVAAL: G. S. Gundle, P.O. Box 5173, Corner Ambrose & Van Boek Streets, Johannesburg.

TRIPOLITANIA, CYRENAICA & LIBYA: M. Albanizzo, 5, Via Siracusa (Box 220), Pal. R.A.S. Tripoli, North Africa.

CYPRUS: Costas G. Constantinides, P.O. Box 617, Nicosia.

WEST INDIES

BARBADOS: T. Geddes Grant Ltd., Bridgetown.

DEMERARA: T. Geddes Grant Ltd., Box 407, Georgetown, British Guiana.

JAMAICA: T. Geddes Grant Ltd., Box 278, Kingston.

TRINIDAD, LEEWARD & WINDWARD ISLANDS & DOMINICA:

T. Geddes Grant Ltd., P.O. Box 171, Port of Spain, Trinidad.

CUBA: Domingo Carballo, P.O. Box 2584, Havana.

CANADA

QUEBEC PROVINCE: C. F. McKim, 1103 Mayor Building, Montreal 2.

ONTARIO PROVINCE: G. M. Butterworth, 84 Hubbard Boulevard, Toronto 8.

CENTRAL AMERICA

EL SALVADOR: Agencias Goodman, Apartado Postal 550, San Salvador, El Salvador.

MEXICO: P. A. O'Hea, Calle Gante 15, Mexico City, D.F.

SOUTH AMERICA

ARGENTINE: Patricio G. Kelly, Ave. Pte. R. Saenz Pena 616, Buenos Aires.

BOLIVIA: Joseph Fessel Bertig, Agencias Anglo Americanas, Casilla 1325, La Paz.

CHILE: James Stuart & Co., Hampden House, 84 Kingsway, London, W.C.2.

PERU: Gibbs & Co., S.A., Lima, Peru.

URUGUAY: Candido Bruzzone, 25 de Mayo 705, Montevideo.

VENEZUELA: C.I.R.C.A., Misericordia a Pele El Ojo 161, Apartado de Correos, 43, Caracas.

ASIA

BAHREIN, IRAN, IRAQ, KATUR, KUWAIT, LEBANON, OMAN, SYRIA: Charles Kendall & Partners Ltd., 7 Albert Court, Kensington Gore, London, S.W.7.

BORNEO & MALAYA: "Hecla," 49 Scotts Road, Singapore.

ISRAEL: Hans Friedlander, P.O. Box 1905, Tel-Aviv.

AUSTRALIA: Carr & Elliott Pty. Ltd., Box 3288, Sydney; Box 1308 M, Melbourne; Box 1971X, Brisbane; 142 William Street, Perth, and Devon House, 90 Pirie Street, Adelaide.

NEW ZEALAND & SAMOA: Morgan & Aickin, P.O. Box 206, Wellington, C.1.

and P.O. Box 270, Auckland.

EUROPE

GREECE: A. Tsaoussis, 33, 3rd September Street, Athens.

ICELAND: Orka H. (Power Ltd.), Reykjavik.

MALTA & DEPENDENCIES: General Building Material Agency, 10 West St., Valletta, Malta G.C.

NORWAY: T. Plesner & Son A/S, Kongensgate 7, Oslo.

TURKEY: Tekyol, Ticaret Turk Anonim Ortakligi, Karakoy Palas, Kat: 4, Galata, Istanbul.



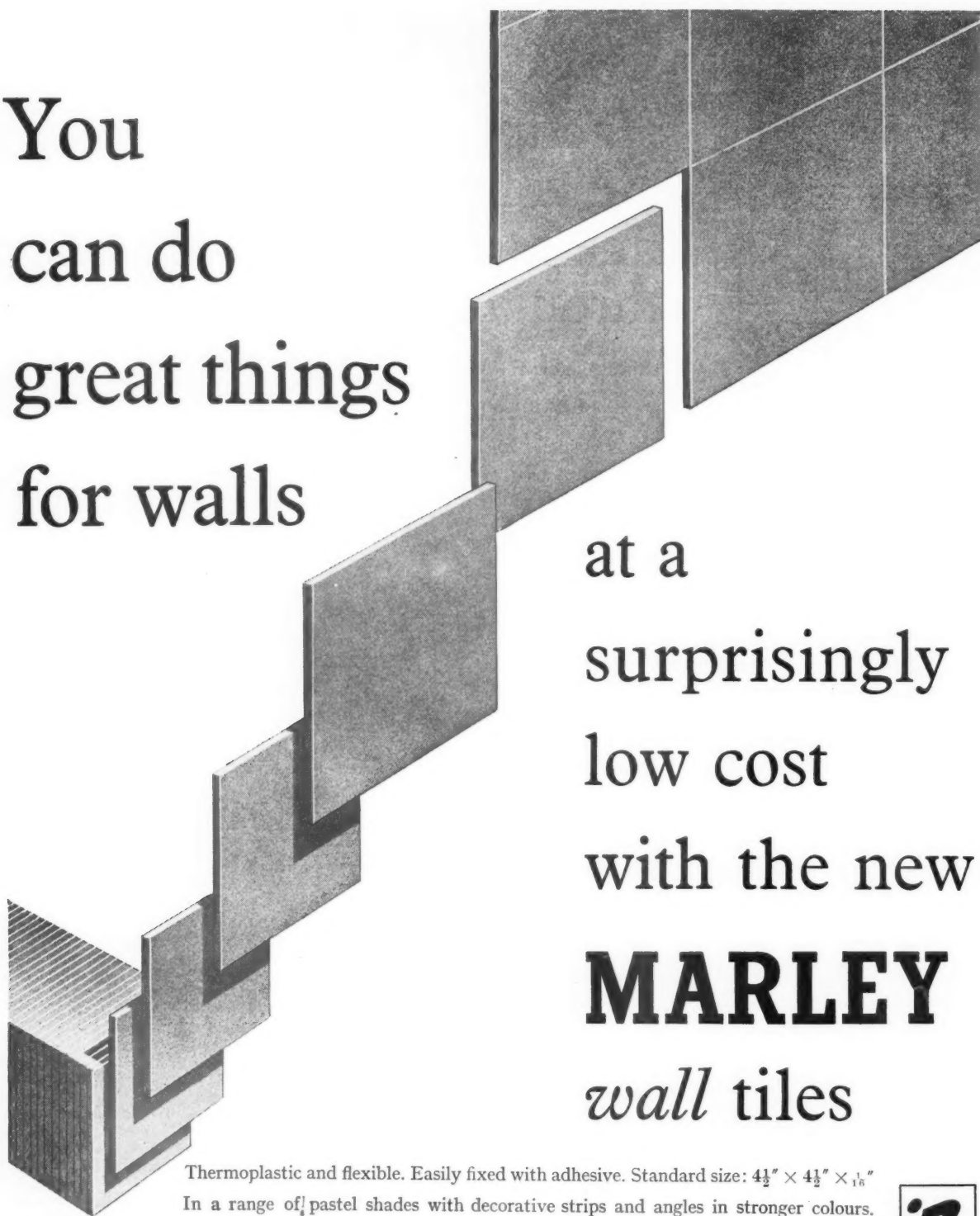
CARTER & CO. LIMITED, POOLE, DORSET

J. H. BARRATT & CO. (1927) LTD. Boothon Tile Works, STOKE-ON-TRENT

The tile manufacturing companies of THE CARTER GROUP

16

You
can do
great things
for walls



at a
surprisingly
low cost
with the new
MARLEY
wall tiles

Thermoplastic and flexible. Easily fixed with adhesive. Standard size: $4\frac{1}{2}'' \times 4\frac{1}{2}'' \times \frac{1}{8}''$

In a range of pastel shades with decorative strips and angles in stronger colours.

Ask our representative to call and show you samples:

The Marley Tile Company Ltd., London Road, Riverhead, Sevenoaks, Kent.

Sevenoaks 55255



433 E

435 F

439 T

449 M

452 T

A.B.S.

The
is ag
of th
Mr.
Nige
amon

Th
Ston
of th
be d
more
2 a.m
each
Secre
table

Th
socia
and
The

It
old
owin

Ame
Mr.
post-
Tech
1955

M
and
studi
when
a Ro
in 19
of M

R.I.B.

Cop
now
R.I.B.

SEPT



THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

THIRD SERIES VOLUME SIXTY-TWO NUMBER ELEVEN TWO SHILLINGS AND SIXPENCE
66 PORTLAND PLACE LONDON W1 TELEPHONE LANGHAM 5721-7 TELEGRAMS: RIBAZO WESDO LONDON

SEPTEMBER 1955

- | | | |
|--|---|-----------------------|
| 433 Editorial | 456 The Annual Convention of the American Institute of Architects—Jeanne Davern | 463 Book Reviews |
| 435 Factory Project for The Aspro Group of Companies | 457 New Pumping Station, Sawbridgeworth, Herts. | 464 Correspondence |
| 439 Tiles, Faience and Mosaic in Modern Building: Part II—Thomas Howarth [A] | 458 Review of Construction and Materials | 465 Notes and Notices |
| 449 New Technical College, Plymouth | 460 Report of the Fourth I.U.A. Congress | 466 Obituaries |
| 452 The Restoration of the Stoa of Attalos, Athens—Edward Passmore [A] | 461 Practice Notes | 467 Members' Column |

A.B.S. Ball 1955

The A.B.S. Ball this year will be on Thursday 8 December. It is again to be held at Grosvenor House, Park Lane, and is in aid of the A.B.S. Homes Trust. It will be under the Presidency of Mr. C. H. Aslin, C.B.E., President R.I.B.A., and The Right Hon. Nigel Birch, M.P., Minister of Works, has kindly consented to be among the patrons.

This year, as last, there is to be a 'theme'. This time it is 'The Stone Age', which should give plenty of scope for the ingenuity of the London schools of architecture students, who will again be designing the décor and table decorations. There will once more be a wide variety of side shows, and dancing from 8.30 to 2 a.m. to Sydney Lipton's Ballroom Orchestra. Tickets, at £2s. 5s. each, including supper, can be ordered from the Hon. Organising Secretary to the A.B.S. Ball, 55 Pall Mall, London, S.W.1, and tables for individual parties of six or over can be reserved.

The Ball has become one of the highlights of architectural social life, and it is hoped that former patrons will come again and those who have not yet patronised it will do so this year. The cause is a good one and the fun considerable.

It is hoped that the projected competition for the design of the old people's homes will be held shortly. This has been delayed owing to protracted negotiations over the site.

American Scholarship for British Architect

Mr. Derek Anthony Cobb, Dip. Arch. [A], has been awarded a post-graduate scholarship by the Massachusetts Institute of Technology and a Fulbright scholarship for the academic year 1955-56 to study for the degree of Master of Architecture.

Mr. Cobb was awarded an A.R.C.U.K. scholarship in 1942, and after serving three years in the Fleet Air Arm resumed his studies at the Manchester University School of Architecture, where he qualified in 1950. He was R.I.B.A. Pugin Student 1950, a Rome Finalist in 1950, and commended in the Soane Medallion in 1953. Since qualifying he has worked as an assistant in the office of Mr. Brian O'Rorke, A.R.A.[F].

R.I.B.A. Prizes and Studentships pamphlet

Copies of the R.I.B.A. pamphlet *Prizes and Studentships* 1955 are now available. Copies may be obtained from the Secretary, the R.I.B.A., price 2s. 6d.

Forthcoming R.I.B.A. Exhibitions

The programme of exhibitions in the forthcoming session is still under consideration. The Council have accepted an offer from the Central Electricity Authority to prepare an exhibition on the uses of pulverised fuel ash in building. This exhibition will be designed specifically to interest architects and it is hoped to stage it from 12 to 20 October. Arrangements are also in hand for another technical exhibition to be held about the end of the year. This is being prepared by the Ministry of Works and will cover the work of the Ancient Monuments Department, dealing especially with the techniques which the officers of the Ministry have evolved in the repair of old structures.

In the spring of 1956 there is to be a major exhibition illustrating recent architecture in Australia. This is being prepared in conjunction with the Royal Australian Institute of Architects.

Portrait Plaque of Phené Spiers

We illustrated in the March JOURNAL a small portrait plaque of Phené Spiers which had been given to the R.I.B.A. The records of the Library showed that a plaque had been presented to Phené Spiers in 1905 on his retirement from the post of Professor of Architecture at the Royal Academy School and that small replicas had been given to subscribers to the fund.

Several members have informed us that they possess duplicates of the plaque we illustrated (to full size) so it seems clear that the plaque in the possession of the R.I.B.A. is one of the replicas. One member reported that he possesses one of the bronze replicas and a larger one made of lead. The latter in all probability is a casting from the mould made for the bronze original. As yet we have not discovered the whereabouts of this bronze original, the one actually presented to Phené Spiers.

Appeal for Cranbrook Mill, Kent

The finest windmill in England is badly in need of repair and the Society for the Protection of Ancient Buildings has launched an appeal for £2,500 to meet the cost. If the work is done, the Kent County Council has agreed to accept financial responsibility for future maintenance and the owners will present the mill to the Council and continue to run it at a peppercorn rent. The mill was built in 1814 and is the highest in the country. It is still in working order and is occasionally used. Donations should be sent to the S.P.A.B., 55 Great Ormond St., W.C.1.

R.I.B.A. Arrangements for the Session 1955-56

The card listing the general meetings and lectures in the forthcoming session is being sent to members with their copy of the Kalendar. On 1 November the President opens the session with his second Inaugural Address. At the same meeting the London Architecture Bronze Medal for 1954 will be presented to Dr. J. L. Martin [F], Architect to the London County Council, in respect of blocks of flats on the Ackroydon Estate; these were illustrated in the last JOURNAL.

The first sessional paper is to be given on 6 December by Mr. H. S. Goodhart-Rendel, C.B.E. [F]. Any paper on any subject by Mr. Goodhart-Rendel invariably results in a crowded meeting. We understand that proposals which are now being considered for the development of the South Kensington area have prompted him to write this paper, which is entitled *Brompton, London's Art Quarter*.

The second paper, on *The Motorway and its Environment*—an important subject which is very much of the immediate future—is to be given by Sir E. Owen Williams, K.B.E., on 10 January. As all architects know, Sir Owen is an engineer with an appreciation of architectural values of a breadth which is exceptional in his own profession.

'Students' night' is to be held on 7 February when the President will deliver his Address to Students and present the Prizes and Studentships in the year's R.I.B.A. competitions. The critic of the work submitted is Mr. G. Grenfell Baines [A].

On 6 March, Professor Stuart Piggott, F.S.A., F.B.A., is to give a paper on *Ritual and Architecture in Megalithic Monuments*. He is Professor of Prehistoric Archaeology at Edinburgh University. The survey he will give of the origins of architecture is in accordance with the Council's policy of inviting in each session an acknowledged authority to give a paper on one of the allied arts or sciences.

The Royal Gold Medal is to be presented on 10 April and the Annual General Meeting will be held on 1 May.

Mr. Henry Morris, C.B.E. [Hon. A], who has just retired from the post of Chief Education Officer in the County of Cambridge, is to give a paper on 15 May on *Architecture and the Local Community*. Mr. Morris, during his work for education, exercised a very great influence on the design of school buildings. For example, he was responsible for Impington village college, for which the architects were Gropius and Maxwell Fry.

On 19 June Mr. Basil Spence, O.B.E. [F], is to give a paper on *Modern Church Design*. This is another subject of 'news value' to the profession, now that the abolition of building licences is permitting the erection of churches in the many new residential developments that have been created since the war. At the same meeting the Council Election Results will be announced.

The Science Committee are responsible for a symposium and two lectures which are likely to be of interest to all architects. The symposium will be held on 17 January and the subject will be *Drawing Office Technique*; details will be announced later. On 20 March Mr. Edward D. Mills [F] will lecture on *The External Cladding of Buildings*. Members will not have forgotten the 'double act' of Mr. Mills and Mr. William Allen at the Torquay Conference during which they discussed the subject of cladding in their paper on Building Techniques. Mr. Mills made a special study of the weathering of buildings when he was awarded the Alfred Bossom Research Fellowship in 1953. The third lecture is on *Colour in Buildings* by Mr. D. L. Medd [A] and Mr. H. L. Gloag [A], who have made a study of this subject at the Building Research Station.

In devising the annual programme of sessional papers and lectures the Council aim at a wide diversity of subject so that as many members as possible may find something of interest in them. Also, the papers purposely are not confined to purely architectural topics, in the narrow sense of the word.

The Cost of Building Sites

The cost of land for building is one of those influences on the work of the architectural profession which, though infrequently noticed, affects the potential output of work. THE FINANCIAL TIMES published recently an interesting survey of present costs and trends in land sales. Sites for building premises in the centres of London and other cities are selling at as much as £100 a sq. yd. Building land for house development in the Home Counties is costing from £1,000 to £1,250 per acre and in favoured areas as much as £2,000. Single house building plots are selling at prices from £2 to £10 per foot frontage according to situation and amenities. Also the abolition of building controls has stimulated an extremely lively demand for factory sites, many firms preferring to build their own factories rather than buying vacant ones; whether the recent Treasury restriction on bank advances will alter this last state of affairs yet remains to be seen.

Some 'consumer resistance' to building costs is beginning to show, especially in the building of single small houses. This is likely to be strengthened somewhat by the increases in charges for building society and mortgage loans. Also, there is no sign of any likely decrease in the prices of materials, and building wages 'will follow the national wage trend'.

Symposium on Roof Finishes

The report of a symposium held at the Royal West of England School of Architecture at Bristol suggests that similar meetings would be useful in making known experiences met with in actual practice. The symposium was organised by Mr. Denzil Nield [A], construction lecturer at the school, and dealt with roof finishes, including traditional materials such as lead, copper, zinc, tiles and slates, and also others more recently developed.

The purpose of the meeting was to exchange experiences of users of materials and methods, especially information obtained from maintenance, as it was felt that many members of the building industry could tell of happenings, both good and bad, that would be of interest even if some of them dealt with quite small but no less valuable matters, and the speakers certainly got down to brass tacks, or perhaps it would be more correct to say to wrought or sheradised iron nails and copper nails.

The symposium was well attended by architects and surveyors from all parts of the West Country, as well as by builders, clerks of works, foremen, craftsmen and students, all of whom must have benefited from the informative points of detail mentioned by the speakers or brought out in discussions.

A Traffic Idea from Chicago

A bold short cut to ease the traffic congestion of Chicago has been suggested by a local architect, Mr. Mark D. Kalischer, A.I.A. This idea might well be applicable in other cities whose main weight of traffic is along an indented waterfront. He suggests an all-weather, multi-purpose, double-deck bridge, 11½ miles long, extending from the Loop area, which is Chicago's business centre, to the northern suburb of Evanston, joining up with a headland on the way and with an artificial island, connected by a short bridge to the mainland.

The bridge—a high level structure—would have two decks, each carrying four lines of traffic one way and capable of handling 17,000 cars an hour in each direction. Suspended from the sides of the bridge would be a monorail tramway.

The cost is estimated at 175m. dollars and it is suggested could be financed by a road toll. The upper level roadbed would be equipped with steam heating coils to eliminate hazardous winter traffic conditions. The structure would be of reinforced concrete with girders prestressed and prefabricated.

This idea is nothing like so adventurous and novel as it may seem. It is many years since the U.S. built a viaduct railway over the sea to connect the Keys in the Gulf of Mexico.



The elevation fronting on the Bath road, Slough, showing the main entrance on the left. From a photograph of the model

Factory Project for The Aspro Group of Companies

Architect: E. D. Jefferiss Mathews, O.B.E. [F], J. Douglass Mathews and Partners

Chief Assistant: E. J. Hill [A]

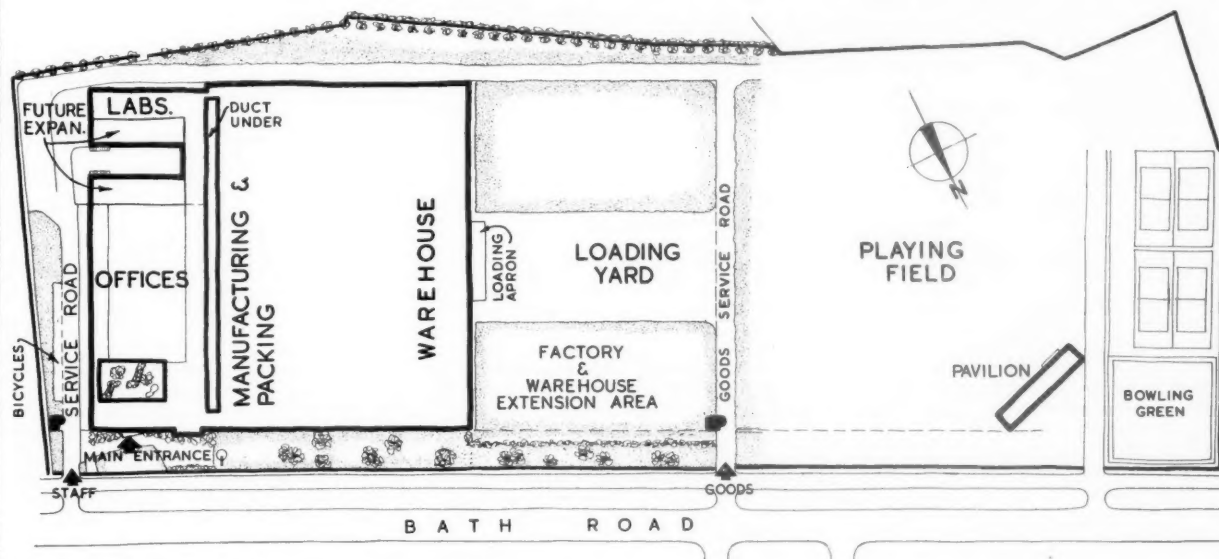
THIS FACTORY PROJECT at Slough, on which work has started, presents features in factory design which are as yet uncommon in this country, though some are better known in the U.S.A. The principal conception is of a single enclosed production and storage area, artificially lit and ventilated. There are no roof lights and no side lights, except small low 'domestic' scale windows along the north side, permitting outlook from the perimeter circulation space.

The advantages claimed for this design are as follows. From a planning point of view there is complete flexibility of plant arrangement and use, demountable par-

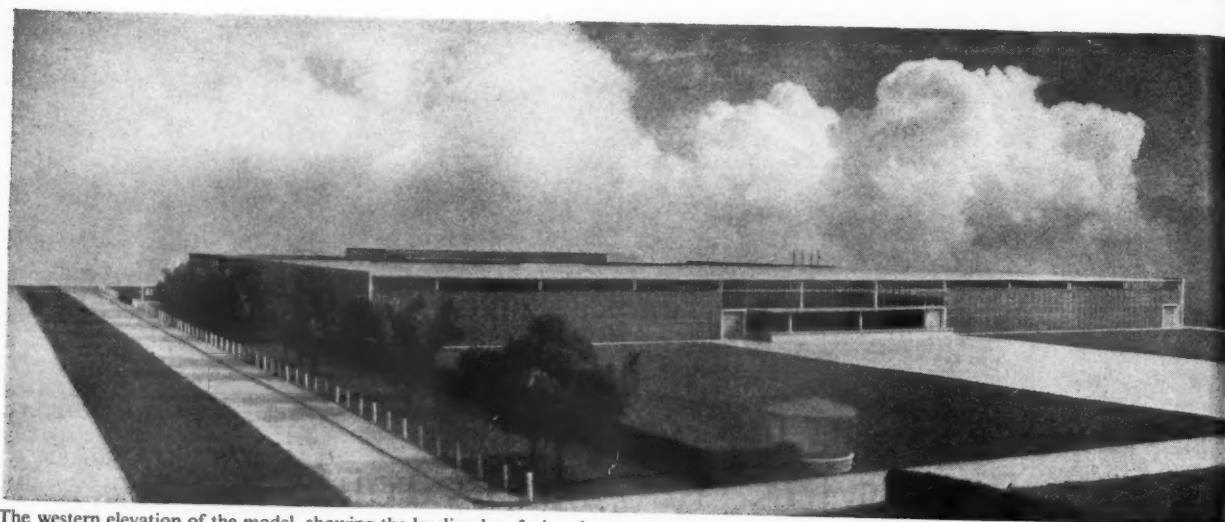
titions enclosing portions as required. The insulated flat roof avoids the thermal insulation troubles which follow from roof glazing; it is argued that the cost of continuous running of fluorescent lighting (the fittings must be provided in any case) is less than that of glass cleaning and heat losses. There is no need to plan for natural side lighting and this adds to flexibility. All the services can be run just below roof level, without consideration of whether they obscure daylighting, and they can be dropped neatly to machines where required; this is more economical and more readily adaptable than service from floor ducts.

The nature of the commodity which is being produced in this factory requires considerable artificial ventilation and dust extraction, and in some cases air conditioning; this has avoided the need to consider and make provision for natural ventilation. The increased cost of mechanical services is more than offset by reduced costs in other directions.

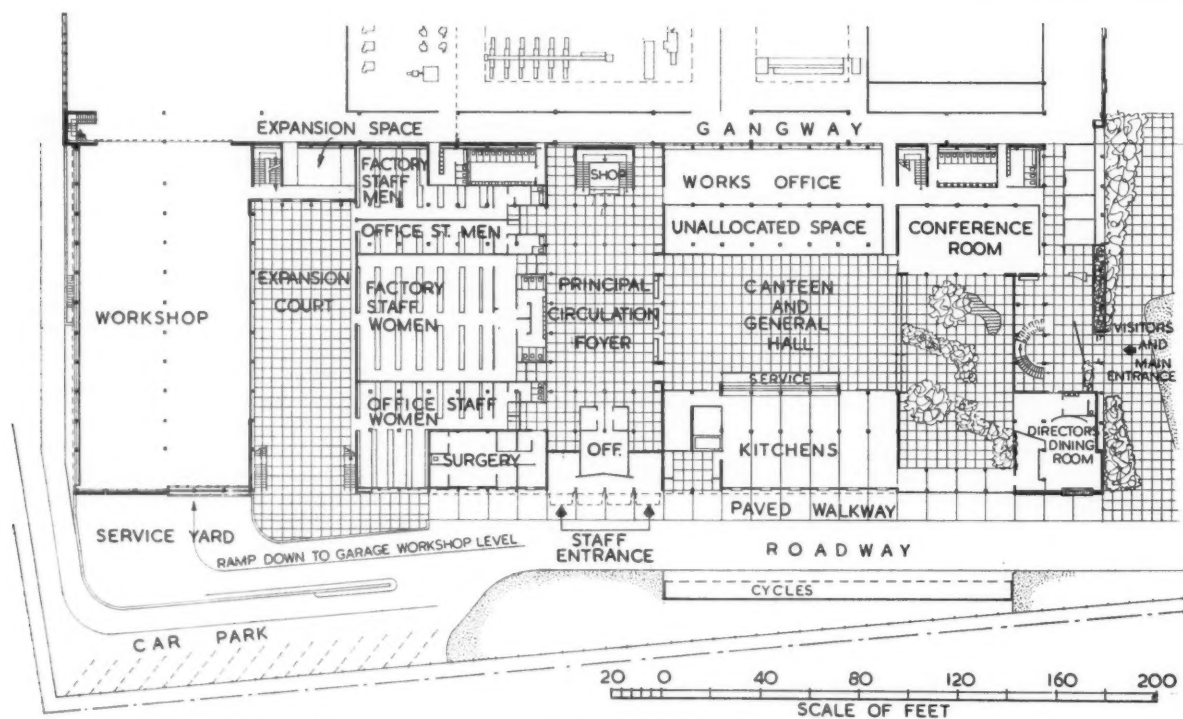
Considerable study has been given to the psychological aspect of people working under these conditions and it has been found that provided the artificial lighting is of the right intensity, of the right kind and properly diffused, there is no impression



The general site plan showing the areas for expansion and extension



The western elevation of the model, showing the loading bay facing the area for expansion



Plan of the ground floor, at the eastern end of the site. The Bath road lies to the right

of working within an enclosed space, and this applies also to the ventilation. There is a great deal of unfounded prejudice against working without natural light, which study shows to be quite unrelated to fact, and although in many factories there is natural light of one kind or another its effectiveness is often largely negative.

Another feature of the design which is unusual in this country is a large single general office, also artificially ventilated and

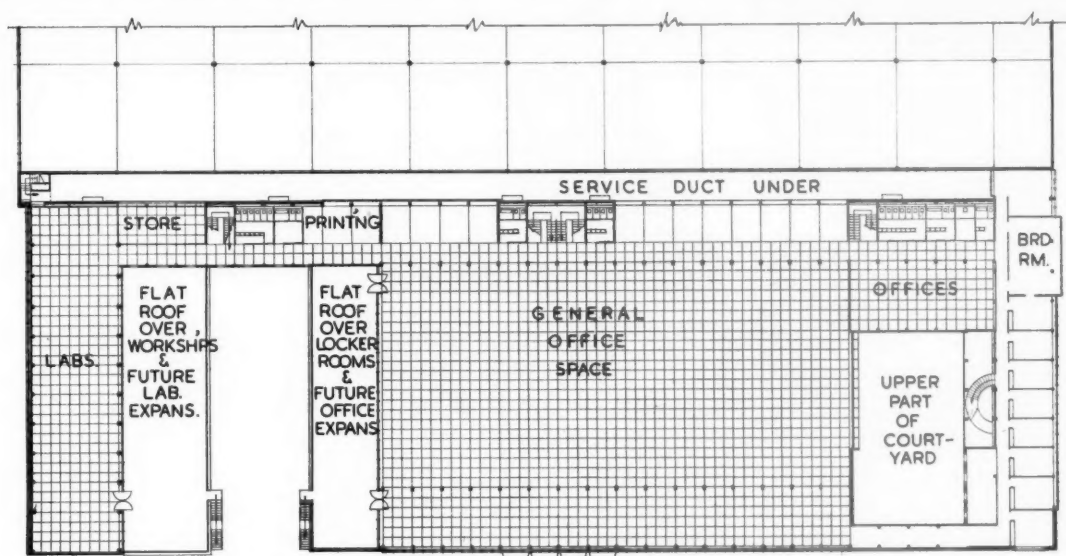
lit, though it has daylighting by continuous low level side-lighting on three sides and high level on the fourth and, in addition, clerestory lighting around the perimeter of the raised portion of the roof. The company have given much study to the two office systems—a number of small naturally-lighted rooms or large undivided spaces for all but the highest executives. They have decided in favour of the latter arrangement, and where this has been tried the architect

is able to endorse—from research both in this country and in the U.S.A.—that for the nature of the work to be carried out in this general office the company have made the right choice.

The company are concerned with the manufacture of a number of pharmaceutical products and their packaging and also have a packaging business handling a wide variety of goods which require special packs. The nature of the business is



The eastern elevation of the model, showing the staff entrance and, in foreground, the ramp down to garage workshop



Plan at first floor level showing the undivided general office space

such that new products and production methods are constantly being introduced and the possibilities and production requirements of such new products cannot readily be determined in advance.

The company required a single building accommodating all units. Space and arrangement of plant had to be flexible and capable of easy expansion. Extensive space for storage of raw materials, warehousing of finished products, administrative and directorate offices, staff services and amenities (such as locker rooms, lavatories, canteens and recreation), service laboratories and workshops and the servicing of travellers' cars, had to be provided.

The rapid expansion and development of the business necessitated an exceptionally

quick building programme. The problem was placed before the architect in the autumn of 1954. Work was started on the site in July 1955 and completion is scheduled for the latter part of 1956.

The contract has been let on a negotiated basis of net cost plus a fixed fee, by which means a much earlier start on the site was possible than by any other means.

The site was already owned by the company, part of it being already used as their sports ground, and it will continue to be so used. It lies on the south side of the Bath road, facing the Slough Trading Estate. It has a gradual fall from west to east with a comparatively deep sinking of about 10 ft. below normal at the south-east corner.

The design falls into two major parts:

(1) the production, storage and warehouse area to the west, and (2) the offices and staff services block to the east; to the south in this block the workshops and laboratories are also placed.

The production, storage and warehouse area is contained in a single-storey building undivided by structural internal walls. This area provides complete flexibility for variation in production layout. There are some three or four separate units in the production areas and these are sited at the east end and are screened, as may be necessary, with demountable partitions. As expansion is required these partitions will be moved westwards into the storage and warehouse areas, these in turn expanding westwards by the addition of bays to the building. The west wall, which is formed

in Holoplast curtain walling, is demountable and will be moved forward and re-erected as the building expands. The north and south walls are not demountable.

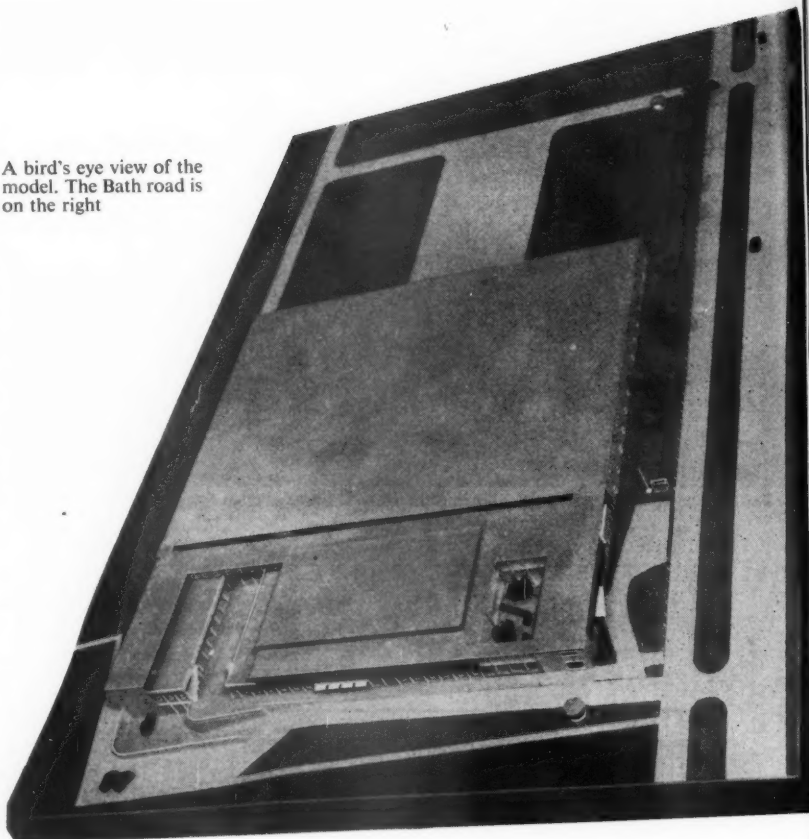
A considerable amount of electrical and mechanical service is called for in the production areas, but the height required for these areas is less than that needed for storage and warehousing. This situation has been met by designing the services space for the production area at high level, in what may be termed the roof space. As production expands so this service space can expand under the small level roof decking as required for the storage and warehouse area, and a uniform roof level is therefore obtained.

The offices and staff services are housed in a two-storey building with a lower ground floor at the south, using the gradients of the site, to accommodate the power house and car servicing shop. This part of the building contains a number of units as follows. On the ground floor the north frontage to the Bath road provides the main entrance and ancillary accommodation; above this are the directors' offices and their ancillaries. In the central area on the ground floor is the canteen and also some office space adjacent to the production area for work closely associated therewith, and opposite the canteen are the locker rooms and centralised staff lavatories.

Dividing these two last areas is a wide entrance foyer serving as staff entrance and as access to the production, storage and warehouse areas and to the general offices. This foyer is intended as a circulation and recreation space as well as for the provision of a staff sales shop and the display of products. Above the canteen, foyer and locker rooms there is an undivided office space 190 ft. by 140 ft., with a clear span of 91 ft. over the major area. On the ground floor at the south end are the machine tool assembly and repair workshops in close relation to the production areas, with the service laboratories above them and car maintenance and power house below.

The construction of the production, storage and warehouse building is in uncased steel frame with light lattice steel roof members and a thermally insulated roof deck. The steel frame grid is 44 ft. by 40 ft. The clear height to the underside of the lattice beams is 20 ft. The permanent north wall is in brickwork with buff facing bricks, the demountable curtain wall at the west end being in natural brown Holoplast and aluminium framing.

A bird's eye view of the model. The Bath road is on the right



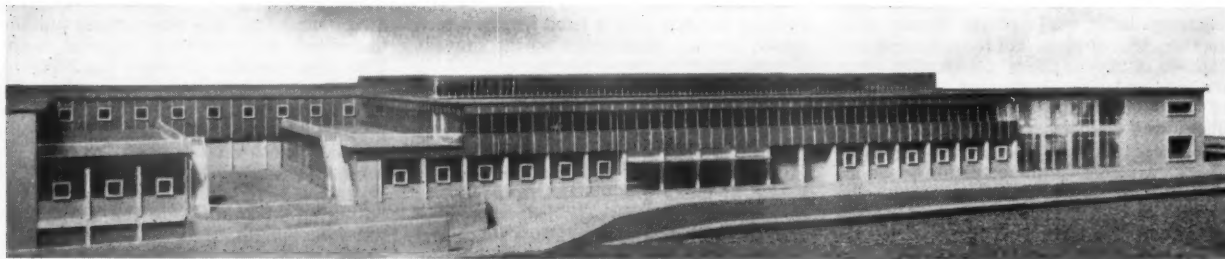
The constructional design of the office and staff services building is steel frame on orthodox post and beam principles, the steel being cased up to the first floor and uncased above. Light lattice steel roof trusses carry the thermally insulated flat roof deck. Precast reinforced concrete panels form the floor, but an exception to this form of construction occurs in the floor spanning the canteen, where the span of 60 ft. is covered by a post-stressed precast concrete deck having an overall depth of 1 ft. 11 in., providing within the precast members ducting space for artificial ventilation.

The ground floor perimeter walls vary between brick panel walls, glass brick panels and glass screens, according to space usage. In general, Holoplast curtain

walls form the first floor perimeter walling. In all cases of perimeter walling the thermal insulation aspect—both of wall panels and windows—and the keeping down of maintenance costs have been considered an important aspect.

Colour will form an important part in the external finishings; it will in general be achieved by small areas of strong primary colours and the use of transparent glazed screens showing the colours of the internal decoration.

The consulting structural engineer is Mr. A. C. Aston, B.Sc., A.C.G.I., D.I.C. Messrs. G. H. Buckle and Partners are the consulting electrical and mechanical engineers, and the quantity surveyors are Messrs. Harris and Porter. Messrs. W. and C. French are the contractors.



Another view of the eastern elevation of the model

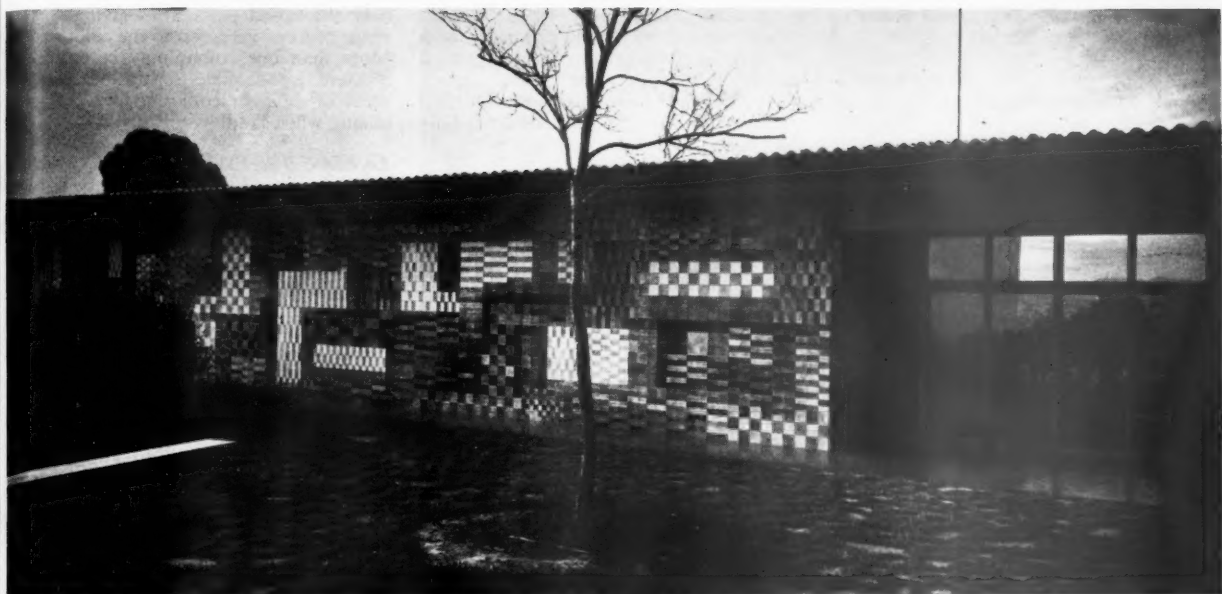


Fig. 1. House in São José dos Campos, Brazil. Mural in painted azulejo tiles designed by Burle Marx. Architect: Rino Levi

Tiles, Faience and Mosaic in Modern Building Part II

By Thomas Howarth, Ph.D. [A]

A Shortened Version of the Report for the Alfred Bossom Research Fellowship 1952

TILES are of two kinds—dust (earthenware) bodied, and plastic (clay) bodied. The former should be used for internal work only; the latter, generally speaking, are frost resisting and, therefore, suitable for external application. It is most important that the right kind of tile be used for all outside work, especially in exposed positions, and the manufacturer should be left in no doubt as to the quality required. In certain circumstances a frost-proof tile made of fireclay—the body being similar to that of a fire brick—may be recommended. Although obtainable with glossy or eggshell glazes, the colour range of this type is limited. Fireclay tiles are usually made to brick sizes 9 in. by 3 in. and 4½ in. by 3 in. to permit the matching of brickwork joints.

Wall tiles are standardised in Britain to B.S.S. 1281 (1945). It should be noted that this specification does not lay down standards of durability but only a standard range of sizes for all internal work. 'All tiles', it states, 'shall be reasonably true to shape, flat and free from flaws.'

Standard tiles are of the following sizes of ¾ in. thickness: 6 in. by 6 in.; 6 in. by 3 in.; 6 in. by 2 in.; 6 in. by 1 in.; 4 in. by 4 in.; 4 in. by 2 in.; 4 in. by 1 in.

Of ¼ in. thickness: 6 in. by 6 in.; 6 in. by 3 in.; 4 in. by 4 in.

Manufacturers also make several special shapes—octagons and hexagons, for example—which, on account of the attractive patterns they produce, are again enjoying considerable popularity and will probably continue to do so.

In addition to the flat tile there are many standard tiles complementary to the foregoing—cappings, skirtings, angles, etc.—too numerous to describe here. Most manufacturers produce an extensive range of complementaries to work in with their standard products, and, of course, special tiles can always be made to order. It is naturally more economical to work within the range offered, but again the manufacturer will co-operate readily in solving particular problems.

The report then describes processes of manufacture, preparation of the materials to form 'dust' and 'plastic' tile bodies, glazing, decoration and firing. The author tabulates the properties of the two types of body, the 'dust' body resulting in a relatively fragile tile of high finish which resists crazing and the 'plastic' body giving a coarser, tougher and more readily crazing tile.

Glazing is the application of a fusible glass in powder form which, in firing, becomes part of the body of the tile. The surface of white glazed earthenware tiles is the least likely to craze, the highly glazed and strongly coloured tiles being more vulnerable. There are two methods of obtaining decorative effects: with 'under-glaze' the colour is applied to the tile under the glaze and is therefore protected and permanent, though the colour range is limited and outlines may be blurred; with 'on-glaze' the colour is applied over the glaze and the tile fired again; it is more subject to abrasion, but great variety of colour is obtainable and outlines can be precise. Metallic finishes are applied as on-glaze but in the opinion of the author are particularly susceptible to abrasion.

Architects should base colour schemes on several samples, because of colour variation in individual tiles, and not solely on coloured reproductions in catalogues. The colour should be seen on the right body. Glazes available are: glossy, eggshell and matt, mottled and majolica; the last is distinguished by a metallic lustre.

The report continues:

Methods of Decoration. Few architects seem to be aware that it is possible to produce many alternatives to the uniformly coloured glazed tile without resorting to applied decoration. If the surface of the biscuit is impressed with an overall pattern—say of small squares or circles—or if the surface is roughened in some way—grooved, scratched or pitted, for example—the colour and glaze, when floated on, will settle out in a variety of different ways. This simple method of producing an interesting texture has by no means been fully exploited by the design studios, and

architects might well make some personal contribution in this field.

The traditional—and conventional—methods of decorating ceramic ware are hand painting, printing and stencilling, all of which may be done under or over the glaze.

Hand Painting has been practised from ancient times. A high degree of skill is demanded of the artist-craftsman and the process is necessarily slow, except for certain kinds of work—some linear patterns, for example—which can now be done mechanically.

The design may be limited to one tile or—more usually in hand painted work—it may spread over a large area embracing many tiles. There is virtually no limit to the kind of design that may be painted, although very fine lines should be avoided, and, as so often happens in the minor arts, broadly conventionalised forms are usually more telling than representational ones.

The selection and application of good colour is complicated by the fact that the hues change during firing. The painter is never absolutely certain of the precise effect he is creating until it is too late to make modifications. He must therefore acquire a sound knowledge of his materials and the processes through which they pass after leaving his hands. It is his duty very often to translate into the ceramic medium designs submitted by the architect or by other artists, and in the light of his own experience he may be obliged to suggest alterations. The advice of the experienced craftsman is invaluable—but he is usually a conservative individual and by no means infallible. For unusual or special work the manufacturer will be glad to produce trial pieces painted to the required colours or the nearest possible hues and fired.

Ceramic colours will easily run together during painting and firing, and it is necessary therefore to form a barrier of some kind between adjacent pigments. This is usually done in one of two ways, either by forming a raised line or ridge on the surface during the process of pressing the dust body (known as the 'pressed line method') or by a method known as 'tube-line'. By the tube-line process the artist traces the outlines of the design by ejecting from a syringe a thin continuous line of fluid 'slip' of the consistency of thick cream. When this has dried, colours can be floated into the areas enclosed by the slip line, and the whole then fired in the glost oven. Alternatively, the biscuit with its pattern of slip lines only can be fired first, a second firing being necessary when the coloured enamels have been added. The former method is the more economical, but the latter is likely to give cleaner and more satisfactory results.

Tiles decorated by the 'pressed line' method enable the artist to produce finer, more precise lines; the finished surface of the tile is usually smoother and more even in texture. The 'tube-line' process results in greater variation in the modelling—the outlines being more clearly defined and

standing out more strongly from the background—and being a hand process it lacks the precision of the machine-formed pressed line tile. The architect considering work of this kind would be wise to ask for trial pieces of the selected design executed by both methods before deciding which to adopt.

Printing. Decoration can also be applied to the tile by printing, which may be by copper plate or by lithography. In neither case is the pattern printed directly but is transferred first to a paper and thence to the tile. It may be done beneath the glaze or upon it. By this method fine detail and accurate colour registration can be obtained. The resulting surface is perfectly smooth, there being no ridges or raised lines as in the case of the pressed line and tube-line processes.

Stencilling has for long been a simple and popular method of decorating. Unlike hand painting, it does not demand any special skill by the operative. It is important that the stencils should register properly (i.e. meet at the edges), especially if more than one colour is used. Defects in registration appear either as overlapping colours or as excessively wide margins or borders. Samples should be examined carefully for defects of this kind. Quantity production is easy, and the price reasonable, varying again with the number of units required and the number of colours used.

Screen Printing. A recent development that has achieved considerable popularity is screen printing. This process, borrowed from the textile industry, is identical with stencilling except that the pattern is formed upon a piece of silk stretched tightly over a wooden frame. The silk is impregnated with a wax resistant to penetration by the colour. Either by hand or by a photographic process the desired pattern is transferred to the waxed silk. By means of a special solvent, carefully applied, the wax is removed from the areas where the colour is required to penetrate. The screen is then ready for use: it is placed over the tile and colour in the form of a paste is forced through the pattern by means of a squeegee. This again is an accurate, rapid and cheap method of decorating. Soft outlines, intricate patterns and fine lines can be obtained by it. Screen printing becomes economical when five square yards or more of tiles are required. The minimum charge fixed by the trade association for a single screen-printed tile is 2s. 0d. in, say, two colours. Several variations on this method are used by the manufacturers.

Embossing. An embossed tile is one with a modelled or raised surface. The modelling may be in the form of a repeating pattern which would give a rich texture to a wall surface; or it may consist of a single figure placed, perhaps, in the centre of each tile. The modelling is obtained by using a special die in the press—a die with a negative impression. The glaze, when floated on modelled surfaces of this kind, runs into the hollows, and spreads thinly

over the raised parts, thus giving a wide range of tonal variation to the colour used. More than one colour may be employed if there is adequate separation between areas of different colour to prevent them mixing when fired.

Encaustic Tile. This is one in which a pattern impressed into the surface is filled by a ceramic slip of another colour. By this method the design is permanent and will withstand a great deal of wear—the reason why it was used for floor tiling in medieval times.

These last three methods, to be successful, must be employed for designs of simple, direct type. They do not lend themselves to the representation of intricate detail.

The Variable Unit Tile. In recent years several firms, notably Carter's of Poole and Pilkington's of Manchester, have tried to produce a moderately-priced range of hand painted tiles both for interior and exterior use. In tile work generally, in order to bring the price down, quantity production of a limited number of patterns and colours is necessary, yet mass production of a few designs does not encourage either the architect or the client who wishes his building to have individuality. To overcome this problem designers have tried to evolve ranges comprising a small number of unit patterns which, combined in different ways, will produce a variety of effects. Some very interesting results have been achieved, notably by Miss Peggy Angus, Gordon Cullen and H. R. Hidden, working in conjunction with Carter's and T. P. Jones and the design staff of Messrs. Pilkington's.

The tiles are of standard 6 in. by 6 in. by $\frac{3}{4}$ in., 6 in. by 6 in. by $\frac{1}{2}$ in. and 4 in. by 4 in. by $\frac{3}{4}$ in. sizes.

Tile Fixing. It is general practice now for tiles to be fixed by a sub-contractor. Moreover, tiles must be purchased through a builder's merchant or agent, who, although he may not fix, at least receives his profit on the transaction. A few manufacturers have their own staff of professional fixers.

The architect naturally will try to obtain the best materials and he will seek out the most reliable manufacturers. It is of equal importance to secure the services of a first-class fixer (who may be a sub-contractor) and consult him in good time. The fixer has no illusions about the manufacturer's claims to perfection: he has a pretty good idea exactly how frost-resisting Messrs. A's frost-proof tiles will prove to be; and he can hazard a fairly accurate guess at the proportion of twisted or discoloured slabs that will turn up in Messrs. B's consignment of faience.

As in every trade, however good the materials used the quality of finish will depend inevitably upon the competence and trustworthiness of the craftsman. In ceramic work, because of the regular geometrical shapes of the units employed and the complicated and difficult task of setting out, careless or shoddy workman-

ship is
fixer th

General
method
by 'bu
mortar
method
and ra
is dry
spread
the tw

Altho
all tiles
of do
inciden
expert
proper
more
positio
involv
penetr
of frac
In t
that e
is only
adhesi
(which
the til
safety

Th
portar
tiled,
skill c

The
and a
ment.
expan
and c
dition
no eff
if the
mater
It sho
therm
and r
of tile
need

There
to co
kinds
brick
expan
settin
mater

Th
atmo
swell
will
them
affect
comp
of co
sider
shou
the
hung
and
that
avoi
fram

1 A
detail
book
of vie
and c

ship is especially conspicuous. A first-class fixer therefore is a much sought-after man.

General Notes on Fixing.¹ The traditional method of fixing tiles to a wall surface is by 'buttering' with mortar (i.e. spreading mortar over the back of each tile). A method popular for many years in America, and introduced recently into this country, is dry fixing by means of a mastic adhesive spread on the wall. The relative merits of the two methods will be discussed later.

Although architects would prefer to see all tiles manufactured with an undercut key of dovetail or similar section (which, incidentally, is extremely difficult to make), expert fixers maintain that the adhesive properties of the correct mix of mortar are more than adequate to hold the tile in position. Only when other factors are involved (movement in the structure, damp penetration and the like) is there a danger of fracture or loosening.

In this regard it is helpful to remember that even in a large area of tiles each unit is only supporting its own weight, and the adhesive power of the area of mortar (which is, or should be, equal in area to the tile itself) allows a generous margin of safety.

Three factors, then, are of major importance; the nature of the surface to be tiled, the quality of the adhesive, and the skill of the craftsman.

The surface to be tiled should be stable and as far as practicable free from movement. Some movement due to thermal expansion and contraction, or to swelling and contraction due to atmospheric conditions, is inevitable and if slight may have no effect upon the tiled surface; especially if the coefficients of expansion of the walling material and the facing are about the same. It should be noted that the coefficients of thermal expansion of brickwork, concrete and reinforced concrete are so close to that of tiles that in normal conditions no trouble need be anticipated from this source. There is danger, however, where tiles have to cover two adjacent materials of different kinds—for example steel embedded in brickwork—one of which (steel) may expand more than the other, thereby setting up unequal tensions in the facing material.

The stresses in the structure due to atmospheric or other conditions—usually swelling due to high moisture content—will normally be taken up by the tiles themselves. Again, brickwork is little affected by such circumstances, but cement compounds—concrete, for example—and of course timber, sometimes increase considerably in volume when wet. Precautions should be taken therefore to protect from the weather concrete on which tiles are hung—this applies especially to basements and walls, balconies, parapets and the like, that may be tiled on one side only—and to avoid fixing on or against timber or timber-framed structures. Unequal settlement in



Fig. 2. Mathematical tiling at the Railway Arms, West Croydon

the structure of a building, or the deflection of a wall or floor, will often cause the fracture or even the displacement of tiles, but such movements cannot usually be anticipated. Another source of trouble may be vibration from machinery or passing traffic.

The foregoing are the principal 'external' causes of failure in tiling. The quality of the mortar bed and the skill or otherwise of the craftsman as contributing factors to the successful execution of tilework may be considered together.

In preparing a surface for tiling, three conditions require to be met: the surface must be smooth and flat; it must provide the right degree of porosity (suction) for the adhesive properties of the mortar to be fully effective; and it must be sound—the strength of the tiling depending not only on the mortar, but upon the stability of the ground to which the mortar is applied (it is unwise to fix tiles to old plaster, for example).

It is agreed by experienced fixers that the best surface for tiling consists of a well-scratched floating of cement and sand (1 part Portland cement, 2 to 3 parts sand) $\frac{1}{2}$ in. to $\frac{3}{4}$ in. thick, which will take up any unevenness in the ground work. The tiles are fixed to the floating with a mortar (or 'compo'), usually $\frac{1}{2}$ in. thick, and of the same mix (i.e. 1 : 2-3 Portland cement and sand) which, incidentally, may also be used for pointing if the colour is right. The tiles themselves, and the floating, must be thoroughly soaked to prevent the too rapid absorption of moisture from the mortar. The thickness of mortar placed on the back of the tile is always slightly greater—about $\frac{1}{2}$ in. or so—than the thickness of the finished bed. This allows not only for the tile to be pressed and tapped back firmly into position, but permits adjustments to be made for slightly twisted or irregular

units, or for slight unevenness in the floating.

Tiles should be laid in horizontal courses starting from the bottom of the wall since until the mortar has set it is not strong enough to support the weight of the tile—only to hold it in position against the wall.

Tiles close-set, that is with very fine joints, are grouted either with plain Portland cement and water (grey) or, if desired, with Portland cement and whiting, to give a lighter joint, the proportions varying according to the degree of lightness required. For white joints Snowcrete may be used.

Pointing with a mastic of Portland cement and fine sand in equal parts is necessary when wide joints are required. The method is the same as for brickwork and similar variations are possible—e.g. hollowed and struck joints. Fixers state that wide joints considerably strengthen the tiling by tying the units back more firmly to their bed.

The Thin-Setting Method of Fixing. For several years British manufacturers have been experimenting with a new method of fixing wall tiles—a method used extensively in the United States of America since before the 1939-45 war. This is known as the thin-setting method since, instead of the preliminary $\frac{1}{2}$ in. floating coat, or screed, and the $\frac{1}{2}$ in. bed of mortar, a single thin ($\frac{1}{8}$ in.) float of a mastic cement is laid over the wall surface, and the tiles pressed on to it dry. They are not 'buttered'. The manufacturers speak with enthusiasm of this method and claim that it is about 50 per cent cheaper than the traditional method. Not only can twice the number of tiles be laid in the same time, but the process is simple and clean. No water is used, since the mastic is delivered on the site already prepared in tins. Fixers,

¹ Attention must be drawn here to the lucid and detailed treatment of the subject in Carter and Hidden's book *Floor and Wall Tiling*. From the architect's point of view it is by far the most useful section of the book, and contains much helpful information.



Fig. 3. House in Dysart Avenue, Kingston-on-Thames, faced with common tiles. Architect: Eric Lyons [F]

on the other hand, are very reluctant to admit its superiority over traditional methods. They point to the fact that only tiles of first quality lend themselves to this treatment; cushion edged tiles, which are not being produced yet for the home market in Britain, being the best. It would seem however that conservatism is at the root of these objections, since there is a sufficient body of experience both in the U.S.A. and in Britain to substantiate many of the claims of the tile makers.

These claims present a formidable challenge to those who would favour traditional methods. They are principally as follows:

1. Fixing is about twice as fast as by traditional methods.
2. Fixing is dry: no dust, no dirt and no water. This means that work can be carried out in occupied premises, with the least possible disorganisation.
3. Tiles can be fixed satisfactorily on a variety of surfaces—wood, steel, plaster, asbestos, fibre board for instance—the only conditions being that they shall be rigid, level and dry.
4. The mastic bed is not rigid like the cement bed, and its slight resilience reduces very considerably the risk of crazing and

enables the tiles to resist more successfully the inevitable stresses caused by structural movement.

5. The bond between the tile and the wall is stronger and more permanent. (This latter point is one which may be questioned until more exhaustive tests have been carried out.)

An alternative method has been evolved to that of floating a thin coat of mastic over the wall preparatory to laying the tiles which goes a long way towards meeting the objections of the fixers. Each tile is 'buttered' with a dab of fixative at each of its corners and then pressed to the wall. A space of about $\frac{1}{16}$ in. is allowed between the back of the tile and the wall surface for adjustment. The fixative has the consistency of soft soap, it hardens in half an hour and sets in 24 hours. It is a water-bound mastic and therefore its setting time can be retarded by soaking the tile. The makers claim the same advantages as for the other kind, and it too will adhere to almost any non-oily surface.

It is interesting to observe that the tile manufacturers are anticipating a great increase in amateur fixing in the home by these processes and a great increase therefore in the demand for tiles. The method

is so easy, so it is claimed, that the handyman will be able to purchase a box of tiles and tin of adhesive, and himself do a job that normally would not only be expensive because it required skilled labour but extremely dirty and inconvenient too. An impartial examination of the evidence would indicate that such optimism is by no means unfounded, since we know that in the State of New York alone more than half the wall tiles used in 1954 were fixed with mastic compounds of this kind.

Costs. It is not easy to arrive at a fair estimate of current prices for tiling since there are so many variables to be taken into account. Two main factors influence cost however: the size of the job (a large area of tiling being cheaper per yard super than a small one); and the amount of cutting necessary (a straightforward job being cheaper than one involving awkward corners and difficult angles).

By assuming two straightforward jobs, one of 80 sq. yd. and the other of 800 sq. yd., it is possible to give prices that are useful relatively for various kinds of tiling. It is interesting also to note the relative cost of special decorated tiles. The figures given in the table are based upon 1954-55 prices per sq. yd. fixed with the exception of the hand painted and tube line prices, which are ex-works.

Tile Hanging. Although roofing tiles do not come within the terms of reference of this study, the system of wall cladding by hanging tiles—a system traditional to many of the southern counties of England—is worth noting. This method can provide an inexpensive, attractive and satisfactory wall finish and an attempt is being made by several architects, most notably Mr. Eric Lyons [F], to find a modern expression for this technique.

There are two main kinds of tile used for hanging: the so-called 'mathematical tile' which closely resembles coursed and bonded brickwork; and the 'common tile', individual units of which may be rectangular, round-ended, or cut to various shapes, but which are laid with overlapping joints, and in mass resemble fish scales.

The Mathematical Tile. The origin of mathematical tiles is uncertain; they were in occasional use in the early 18th century—Mr. Donald Fenter has dated two examples at 1710 and 1730 in Canterbury. The evidence would seem to indicate that the mathematical tile was introduced to meet a fashionable demand, the demand for houses in the new brick style of 18th-century London. The owners of well-built, timber-framed houses, either of medieval or post-medieval date, unable to face the cost of demolition and rebuilding, had the outside walls battened and hung with brick-like tiles instead. Sash windows were incorporated, painted wooden quoins occasionally introduced at the corners, and a new doorway, with perhaps a porch, completed the transformation.

So ingenious was the mathematical tiler, in fact, that it is often impossible for any but the expert to distinguish a tiled façade

from a wall of solid brickwork. Headers, stretchers, closers, and specials (e.g. 'gauged brick' arches) are all faithfully represented to scale and in brick colours. The tiles were formed in such a way and hung at such intervals that they could be 'bonded' and pointed up with mortar to precisely the same patterns as common brickwork.

The angles of a building and window reveals presented some problem and either angle strips of wood or wooden quoins were introduced. In more mature work special angle tiles were used. Henry Holland, for instance, employed silver-grey brick tiles to reface Althorpe House, seat of the Spencer family at Northampton, and it is difficult to determine where the solid brickwork ends and tile hanging begins.

Ingenuous though this practice may be, at the moment one cannot say whether or not it has any future. The idea of building an imitation brick façade is anathema to the modern school of architects, yet even on aesthetic grounds a case could be made for using brick-tiles for panel walls in, say, a concrete-framed building. Surprisingly few architects know of this form of cladding and it may return to favour.

Brick tiles are still produced (by hand); they are used mainly for repairs. The Railway Arms in West Croydon, for example, was partly faced in this material in the summer of 1950, the tiles being supplied by the Maidenhead Brick and Tile Company (Fig. 2). From the practical point of view, brick tiles are excellent; they offer an attractive and efficient means of weather-proofing a building. Yet identical qualities can be claimed for common tiles—with the added advantage that the architect need have no qualms of conscience in using a material which is expressive throughout.²

The origin of the name 'mathematical tile' is not known. Variations on the simple kind of tile found in Sussex, Dorset and elsewhere in the south are the 'rebated tile' of the Isle of Wight and the 'cranked tile' of Kent.³

The Common Tile. Tile hanging has been used extensively in the south of England—especially in Kent and Surrey—for at least two centuries. More often than not a building is partially tiled, usually above first floor level, but numerous examples remain where the tiles extend from base to eaves line, a practice that may have been common in the 18th century.

Like mathematical tiles, common tiles may be hung on battens, or bedded in mortar, to give stability; unlike mathematical tiles they are not pointed. The general practice is to hang the tiles on battens so that an air space is formed between them and the wall, each tile being secured by two nails. Very little lap is necessary in vertically hung tiling, $\frac{1}{2}$ in. to 1 in. usually being sufficient in all normal work. The gauge for tile hanging is about

Cost of Tiles

	80 sq. yd.	800 sq. yd.
Plain white	39s.	37s.
Oven cream	42s.	40s.
Glazed coloured (glossy, eggshell, matt)	51s.	49s.
Cushion edged (no price available)		
Decorated Tiles:		
Pressed line	100s.	100s.
Embossed	100s.	100s.
Encaustic	100s.	100s.
Printed	75s.	75s.
Hand printed (screen printed)	75s.	75s.
Hand painted 6 in. by 6 in., 5s. to 11s. per tile.		
4 in. by 4 in., 4s. 5d. to 8s. 6d. per tile.		
Tube line 6 in. by 6 in., 7s. 10d. to 15s. per tile.		
4 in. by 4 in., 5s. 4d. to 9s. per tile.		
Metallic glazes: gold and silver tile strip 1 in. wide, 6s. per foot run.		

4½ in.; this means that the tiles can be nailed directly into the joints of a brick-on-edge wall, thus dispensing with battens. The joints, however, must be of lime mortar. The tile units may be rectangular, or cast in various shapes. The most popular decorative form is round-ended but a number of alternative shapes give a wide variety of patterns which can be very pleasing—and purpose-made angle tiles can be obtained even for the patterned ranges.

The standard type of tile is unglazed and of terra-cotta colour; it has been used extensively by speculative builders throughout the country for facing bay windows and infilling gables—and by architects seeking to recapture the romantic character of traditional domestic buildings in the south. It is not surprising therefore that this material has been little favoured by sensitive designers in the past twenty years or so. Now however we may well turn again to the common tile as an economical and attractive form of cladding, which might be used either traditionally in domestic work, or as a panel-infilling to modern framed structures. The warm earth colours and the attractive texture and pattern of joints make a pleasing contrast to the formal shapes of, say, a reinforced concrete frame. Moreover, this kind of cladding is very flexible; unlike tiles bedded in cement, faience slabs, or even mathematical tiles, it is affected but little by structural movement, the units sliding one over the other rather than cracking. Careful fixing (with rust-proof nails) is essential however if individual tiles are not to fall away after a few years' exposure to wind and rain.

Some of the most interesting work in this field has been done by Mr. Eric Lyons (Fig. 3). These experiments might be extended. It is not known whether glazed common tiles have been used for hanging in recent times, but the precedent at Brighton of black-glazed mathematical tiles, some-

times with white joints, suggests that experiments with this kind of finish might be rewarding. The addition of coloured glazes would enhance the reflecting properties of the material and could greatly enlarge its aesthetic possibilities.

MOSAICS

Mosaic is one of the most attractive and most durable of surface finishes. Although often made of the same material as the tile and finished in the same way, it has a warmth and evokes a response from the observer that other forms of ceramic facings do not. This would seem to be related to the fact that the units of which it is made are tiny and present a far less uniform and therefore more interesting body of colour overall. Moreover, the pattern of joints, relatively much more important in the mosaic surface, gives a pleasing texture which is not easy to obtain, and certainly not so easy to comprehend, even in a large area of tiles. It is as though the observer looked at the design through a fine net, sometimes of a regular square or hexagonal mesh, sometimes of irregular shapes, which reduces the intensity of the colours, softens outlines and greatly enhances the total effect.

Mosaic, too, is flexible. It can be laid to curves of a small radius—to face a column of 6 in. diameter, for example—and it will cover with equal ease irregular plane surfaces such as the underside of a shaped concrete canopy.

Like other ceramic materials, mosaic has been greatly neglected by the modern architect and designer. However, with interest renewed in craftwork generally, with the phenomenal success of the recent exhibition of replicas of the Ravenna mosaics, and in view of the exciting work now being done by South American architects, there is every indication that a revival of interest in this useful material is on the way.

There are several kinds of mosaic and several kinds of tesserae—the small pieces from which the pattern is built up.

² It is not easy to arrive at comparative prices for brick tiling and common tiling but the following figures supplied by Mr. C. G. Dobson, J. Hall & Co. Ltd., Croydon, may be considered a fair estimate:

Common tiling 240s. per square (100 sq. ft.), 4½-in. gauge.

Brick tiling 400s. per square (100 sq. ft.), 4½-in. gauge.

These prices allow for fixing to 1 in. by ½ in. battening and for a reasonable profit. Mr. Dobson kindly supplied the photograph for Fig. 2.

³ Research on the subject of mathematical tiles is now being undertaken by Mr. Donald Fenter [4] and Mr. Michael Prendergast [4].

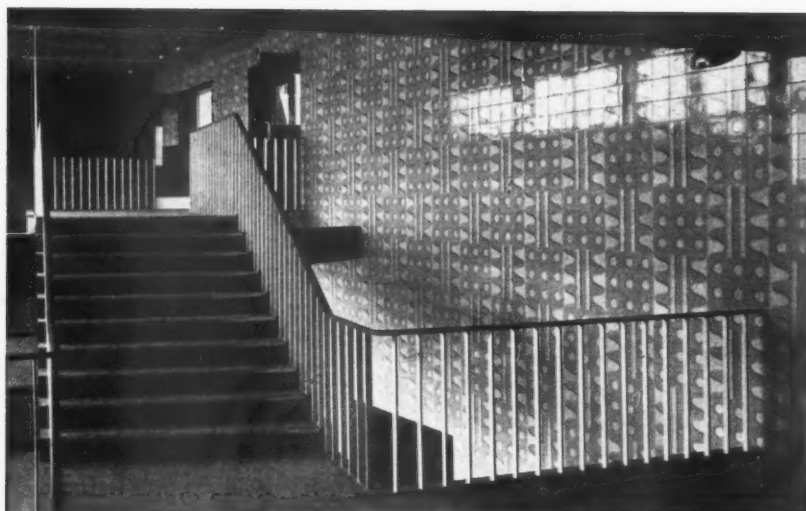


Fig. 4. Variable unit tiles in primrose yellow and white, at the Susan Laurence school, Ricardo Street, Poplar. Architects: Yorke, Rosenberg and Mardall [FF]

1. *Geometrical mosaic* is mosaic made, as the name suggests, of pieces (tesserae) of regular geometrical shapes—squares, oblongs, hexagons, octagons, etc.

2. *Roman mosaic*⁴ (or free form mosaic) is composed from irregularly shaped pieces which are cut by hand to follow a free, or a pictorial design.

In both the foregoing ceramic tesserae are used and the colour range is very limited, browns, greys or greens predominating.

3. *Glazed mosaic*. The tesserae are made of a glazed dust body which allows for a wide range of colours. Though some special frost-proof mosaics are manufactured, generally speaking glazed tesserae are not suitable for external use.

4. *Venetian enamel* (so-called 'Ravenna') mosaic is a glass mosaic of brilliant hue, which if properly laid is set in a doughy bed which permits considerable surface modelling before setting. This is desirable so that full advantage may be taken of reflections and gradations of light. The tesserae have great luminosity—the metallic colours, gold especially, being of exceptional brilliance. In England however it is customary for the tesserae to be mounted on paper and laid in the ordinary way. This results in a far less lively finish.

Mosaic is expensive. The ordinary commercial type of ceramic mosaic, fixed, is about £3 per sq. yd. A small panel in so-called 'Byzantine' mosaic examined recently—a head of Christ, 24 in. by 18 in.—cost £80. Vitreous mosaic, which is imported from Italy, costs about £30 per sq. yd.

⁴ The term 'Roman' is used by some makers and fixers to denote a marble, or Italian mosaic.

⁵ The author has obtained hexagonal tesserae specially faced with an over-glaze gold enamel that was quite successful—at least in so far as colour was concerned. The enamel will not withstand abrasion, however, and has suffered severely at the hands of the cleaner.

Generally speaking, ceramic mosaic is considered by the manufacturer as primarily a floor covering. The body of the tesserae is that of a floor tile, and since floor tiles are unglazed it is not usual for mosaic tesserae to be glazed.⁵ The demand as yet for colourful mosaic is so small that it would be uneconomical for any manufacturer to carry large stocks. This point is worth recording because the architect may well be put off by the drab and limited colour range available in unglazed tesserae, but there is no reason why opaque or transparent glazes should not be fired upon them, provided they are not subjected to wear or abrasion.

Manufacturers might with considerable advantage to themselves no less than to the architect produce a wider range of samples of glazed tesserae for wall facing which would demonstrate the possibilities of this form of decorative treatment. It would seem, too, that there is a case for starting the manufacture of vitreous tesserae in this country. The price of imported material is prohibitive, yet in many respects it is superior to ceramic ware.

Process of Assembly and Fixing. It is customary for tesserae to be mounted at the works upon sheets of stout paper cut to sizes that can be handled easily by one man—usually 2 ft. by 1 ft. But if required they will be delivered loose.

The design prepared by the architect is enlarged to full size by the works studio staff, and upon it is drawn a grid of lines dividing it into rectangles, approximately 2 ft. by 1 ft. Each rectangle represents an area of mosaic that will be formed as a separate unit at the works and each is carefully numbered to facilitate assembly on the job.

For *geometrical mosaic* the selected tesserae are shaken into special frames—rather like egg-boxes for square or oblong

units, or honeycombs for polygonal ones—and the operative then lays over the whole a piece of paper treated with gum arabic or other adhesive that will readily dissolve in water. The paper is clearly marked with a number corresponding to its position in the design; the tesserae are turned out on to it and the gum is allowed to set. When the whole design has been completed, the sheets are stacked awaiting delivery to the job. They must be kept dry throughout, otherwise the gum will soften and the tesserae may move out of position.

The surface on which the mosaic is to be laid must be carefully prepared and screeded to $\frac{3}{8}$ in. below finishing level, assuming tesserae $\frac{1}{2}$ in. thick. A mortar made of one part by volume of Portland cement to two or three parts of a suitable grade of clean sand is recommended by most fixers. Each sheet of mosaic is then laid paper side downwards on a flat surface and the joints filled with the mortar mixture. Meanwhile the actual surface to receive the sheet must be thoroughly saturated with water and floated with mortar to $\frac{1}{2}$ in. below finishing level. The sheet of mosaic, paper side upwards, is then placed in position and lightly beaten into place with a wooden beater. After about an hour or two the paper must be carefully soaked off, any misplaced tesserae being put back into position. The surface is then finally beaten and cleaned. In about 24 hours, when setting has begun, the joints may be grouted and the surface given its final clean-up. Thereafter it must be kept wet and covered for at least a week. Rapid hardening cement may be used if circumstances demand it, but only by those familiar with its special properties.

Roman (or free form) mosaic is laid by precisely the same method as outlined above, there being a difference only in the preparatory work. Instead of using assembly frames for arranging the tesserae prior to mounting on sheets, the operative must mount each piece separately by hand. Moreover, since many pieces will be of irregular shape they must also be cut by hand—but this can be done with surprising rapidity by the experienced worker.

The usual practice is for the full-sized detail of the architect's design to be made in reverse, with all or most of the tesserae shapes drawn in. The operative then sticks each piece on the actual drawing, which is later cut into sections for ease of handling; each section being carefully numbered on the back as before to facilitate assembly.

Glass (or Ravenna) mosaic is usually formed in position by specialist Italian fixers who use their own formulae for the cementing body into which the tesserae are pressed individually, and at varying angles to catch the light. The body retains its plasticity long enough for some modelling of the surface to be carried out. Unlike the paper method of fixing, by which a fairly smooth and even surface is obtained, the Italian method results in a very rough and irregular finish, which in certain circumstances is extremely pleasing. It is a slow and expensive process.

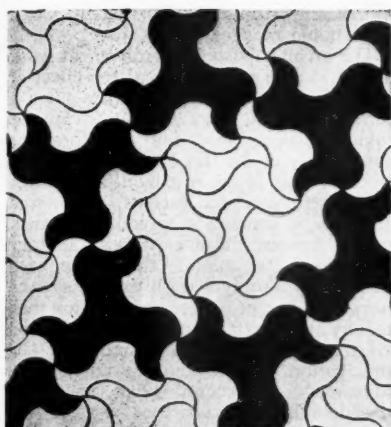


Fig. 6. Italian floor tiles. Patterns built up from a single unit

Special Mosaic Work. When an artist is commissioned to prepare a design for mosaic he usually submits a sketch or cartoon in colour, or perhaps several sketches. When the design is approved he next prepares a full-sized cartoon with coloured details; sometimes a model or several typical details are executed in the actual material to demonstrate colour, surface and texture. Depending upon the nature of the job, the artist may himself model the whole subject, or, alternatively, he will pass on the sample details to craftsmen who mount the tesserae on paper, or who work directly on the finished surface if the Italian (Byzantine) type is being used.

The serious artist will of course wish to supervise the work constantly, changing certain areas and colours as the pattern builds up. This can be done without difficulty where the paper method is used, the tesserae being easily detached from the paper ground and others gummied in their places. Moreover by this method the finished work can be viewed by the artist, the patron and the architect in its entirety (although in reverse) before it is fixed in position. This means that the total effect may be comprehended and last minute adjustments made if necessary.

It should be remembered that optical corrections must be made for designs placed well above eye level (figures and letters, for instance, would require to be elongated) and variations made in the values to compensate for uneven lighting.

For intricately detailed work or when Byzantine mosaic is used, small sections of the design—as small as 8 in. or 12 in. squares—may be modelled personally by the artist in his studio and assembled like a jigsaw puzzle. This, as an alternative to actually working on the job—an arrangement that is not always practicable—enables him to control every detail.

It is of course impossible to give any indication of the cost of work done on this basis. The artist's fee is a matter for negotiation and arrangement with the architect and patron. The artist with his

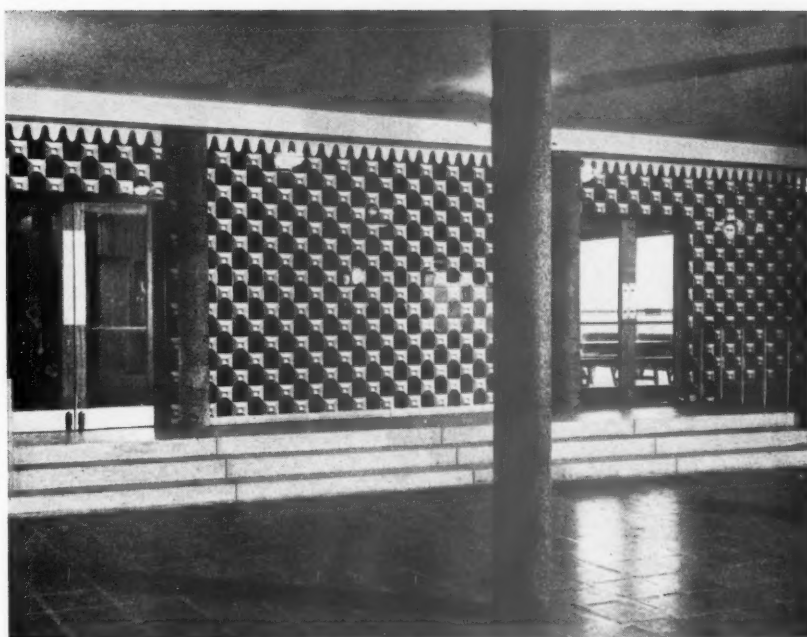


Fig. 5. Wall of tiles painted to simulate relief pattern. Hainault Forest school. Architects: Yorke, Rosenberg and Mardall [FF]

own studio will be able to give a price for the whole job, excluding fixing, if this is to be done by specialists. On the other hand, where the tesserae are assembled and mounted in the manufacturer's workshop and the fixing carried out by him, an artist would be paid a fee for his design and for general supervision of the assembly at final fixing.

Probably the best guide to estimating—and, of course, there are always exceptions—is to assess the artist's fee at 10 or 15 per cent of the total cost of the work, as carried out by the firm supplying and fixing the materials. A good arrangement is to pay the artist one-third of his fee when the sketch is approved, another third when the full-sized cartoon is finished and the tesserae assembled; the final payment being made on completion of the job. The artist's fee will, of course, be a charge additional to that of the materials and fixing.

In order to economise, 'trick' methods may be used. For instance so-called 'silhouette mosaic', where the main subject is worked in tesserae in the normal way and the rest of the ground filled in with coloured plaster or stucco, may represent a considerable saving on a large wall.

SOME PROBLEMS OF DESIGN

Despite the many advantages offered by ceramics as a surfacing material—most notably those of impermeability, good weathering properties and permanent colour—architects often hesitate to use them even in places when such properties would be advantageous. There are several reasons for this, the most important being, no doubt, a strong disinclination to employ a material that in its more ornate and colour-

ful manifestations fell into disrepute at least aesthetically as the modern movement gathered momentum; then again the doctrine of 'purism' has had a profound influence and mitigated against the use of a material that looks like stone and isn't. Few architects have considered, say, terracotta as anything but a poor substitute for stone, and tiles are still generally treated merely as a useful medium for facing kitchens and bathroom walls. Then again, the widespread and rapid appearance of countless shiny white, cream and red, or yellow and black *moderne-style* garages, small hotels and seaside kiosks throughout this country between the wars so distressed sensitive designers that the word 'faience' has become almost a term of abuse in certain architectural circles.

In town and city streets also the ceramic façade more often than not was notable solely for its bad taste. Unlike stone or brick-faced structures, the ceramic façade does not grow old gracefully; it just gets dirty. But it can be rejuvenated quickly and relatively cheaply by the simple process of washing down, and when washed it appears as fresh and colourful as on the day it was built. Thus the architect is denied the many aesthetic advantages of weathering—the harmonising patina, the mellowing tones of traditional materials, and the obliterating mantle of soot. It means, too, that the ceramic façade may contrast violently with its brick or stone-faced neighbours, retaining seemingly perennial youth when they darken and begin to decay.

These points cannot be overstressed, since observation proves that very great care must be taken in designing and

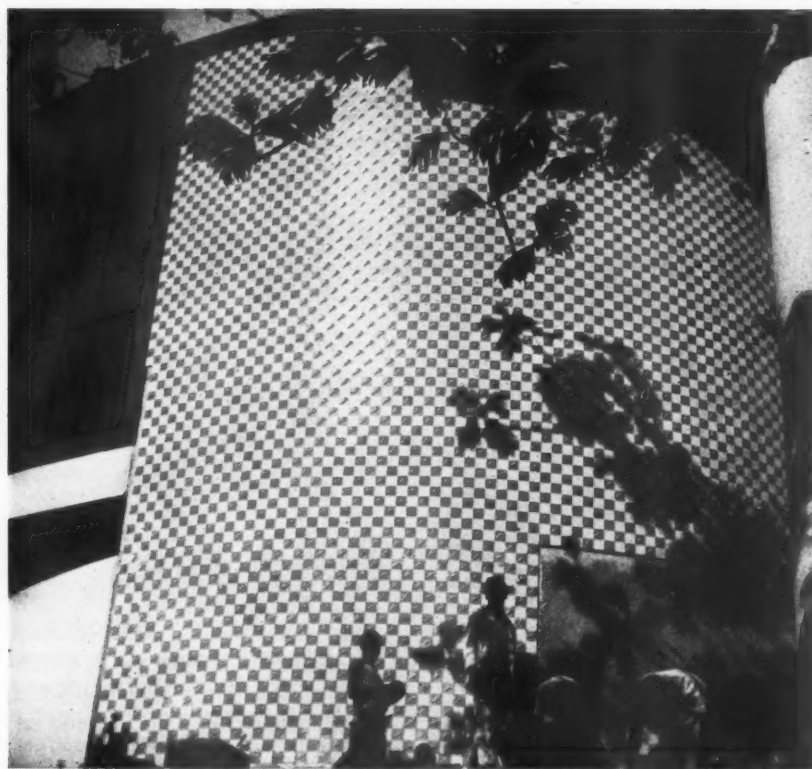


Fig. 7. Façade of embossed tiles, Hotel Bahia, Rio de Janeiro. Architect: Paulo Antunes Ribeiro

detailing such buildings. Ceramics possess distinctive properties and characteristics of their own that must be appreciated and indeed exploited by the designer, if satisfactory results are to be obtained.

Colour. In the field of colour, for example, there is no reason why subtle and delicate hues should not be employed more freely. The range of available colours is surprisingly extensive, and the harsh primaries, the greeny yellows and yellowy greens in common usage are indicative of the limitations of the architect, not of the material.

In glazed ware the colours are fused with the glaze itself and are unaffected by changes in temperature and humidity, the surface retaining its brilliance indefinitely.

Since the colour is produced under conditions difficult to control precisely there is some lack of uniformity between units, and often on the unit itself. These variations are slight in good modern work and in fact may enhance rather than detract from the effect of the finished surface. The incidence of occasional units of slightly lighter or darker hue in a relatively large area of what would otherwise be flat and uniform colour can produce pleasing vitality.

The lack of uniformity of colour in the unit itself usually takes the form of a slight darkening and/or lightening at the edges where the glaze tends to run off. This is especially evident in certain screen-printed

tiles where there is first a banking up of colour and then a run-off almost to white at the extreme edge. In positions where few units are used—say in a fireplace—and when they are likely to be subjected to close inspection, this defect may detract from the general effect of the whole, but in larger areas it becomes quite insignificant.

It is often suggested (e.g. *Post War Building Studies* No. 18, p. 29) that the English climate is responsible for the failure of the polychromatic façade to gain favour; that our rain, fogs and mists are conducive to 'mild matt tones'. But there is evidence now that not only the traditional way of life but the traditional attitude to colour is changing. Colour—sometimes brilliant colour—used sensitively and intelligently for the most part, is the new order of the day.

At the moment however English and Western European architects are using coloured ceramics tentatively. It is fairly common practice to introduce panels of tiles, say, on recessed balconies in new housing projects where a colourful accent is required, but the colours are usually pale blue or yellow and the tiles plain and unpatterned. This simple form of decoration is of especial value in places subject to industrial atmospheric pollution since, in the long run, ceramics are much more economical than paint. But there is the disadvantage—if disadvantage it may be called—that the colour is permanent and cannot easily be changed. This means that

superficially striking effects that may well date should be avoided.

The architect's special problem in work of this kind is to ensure that the effect of weathering on adjacent materials after a period of several years will not disrupt the colour relationships, and therefore the initial unity of the façade. For instance, a block of flats faced in a light-toned brick with carefully related accents in coloured tiles may, if situated in an industrial area, appear far less attractive when the tone and indeed the colour values have been changed by a sooty deposit that adheres to everything except the ceramics, which then acquire an importance out of all proportion to that intended by the architect. The anticipation of this, and the appropriate adjustment of colour values, calls for considerable skill on the part of the designer. Only if the surfaces of the two materials—the bricks and tiles—are similar in texture (that is glossy, matt, or rough) will weathering be reasonably uniform.

As yet there are no major examples of modern patterned or decorated ceramic-faced external walls in this country, although the Royal Festival Hall is a tentative experiment. Several architects have experimented boldly with internal walls, excellent examples being at the Ricardo St. School, Poplar, and Hainault Forest Secondary School (Fig. 5), both by York, Rosenberg and Mardall. This represents a notable innovation of recent years—the reintroduction of the patterned tile as a whole-wall decoration—and is indicative of a general movement towards a style of building with a richer decorative element.

The tiles at Ricardo Street (Fig. 4) are especially interesting since they are of geometrical variable unit design, the pattern being built up from a few basic shapes combined in various ways. In most of the samples of the variable unit range available the colour is good, the patterns bold and simple. While simplicity remains the keynote, interesting and useful developments may be anticipated, but one fears over-elaboration and complexity when the range of elementary geometrical forms has been exhausted. So far as is known nothing of this kind is to be seen in Western Europe. Architects and manufacturers in Holland, Switzerland and Germany to whom this work was mentioned, while showing enthusiasm for the idea, knew nothing of similar work come to hand from Italy or Scandinavia.

Provided that the manufacturers can reduce costs—and with standardised designs and a limited range of colours there seems no reason why this should not be done—there is every reason to believe that architects will make extensive use of the variable unit tile, especially in the more neutral hues. Cost, however, remains the deciding factor.

Texture and Pattern. Just as the dark linear pattern of came in a stained glass window contributes to the success or otherwise of the whole design, so with ceramics the

network of joints materially affects the appearance of the finished job.

In faience and terra-cotta walling the joints are of necessity wide. Since the units are relatively large—up to about 18 in. by 12 in. on the face in general practice—some distortion inevitably occurs in firing, and variations must be taken up by the joint which even in 'ashlar' work may be as wide as $\frac{1}{4}$ in. or $\frac{1}{2}$ in. This means, of course, that the joint pattern may stand out in strong contrast and, unless taken into account by the designer, completely ruin the effect of a façade. To reduce the contrast the mortar may be tinted to approximately the colour of the surface, but it is important to note that in industrial areas the sooty atmospheric deposits adhere firmly to the rougher texture of the mortar and soon emphasise the joint pattern.

In ornate 19th-century work terra-cotta panels and the like, modelled often in high relief, were sometimes so skilfully designed that the joints were practically invisible. On the other hand many such details were, to our eyes, made even more repulsive by the thick stripes of mortar which writhe indiscriminately over cherub and acanthus, volute and console. The lesson to be learned from observing such work is again unquestionably that careful detailing is essential to the success of any project in these materials. In modern examples, decorative features other than an occasional panel in relief or in colour are the exception, and therefore, since the eye is not distracted by ornament and sculpture from the colour and quality of craftsmanship displayed in the surfacing material, jointing, detailing and finish become of paramount importance.

Observation of work in many parts of Britain proves that the least pleasing effects are almost invariably obtained where a white or near-white slab is used. In such cases—which incidentally seem most prevalent in industrial areas—the joints rapidly darken, and thereby the theoretical point of maximum contrast—black and white—is approached. Even though in such an arrangement the optical illusion of the spilling over of light from the intense white surface has the effect of reducing the apparent width of the black (joint) lines, the overall effect is still usually unpleasant. Very light and white units therefore should be used only in special circumstances, preferably where some protection from atmospheric pollution may be obtained.

So far under this heading joints have been discussed in a negative sense, but they may well make a positive contribution to the total effect. This can be demonstrated most clearly by illustrating tiles or slabs that are not rectangular in shape. The joints between polygonal—most usually hexagonal—shapes and interlocking curved shapes in certain circumstances can provide an attractive and highly decorative overall pattern; a pattern moreover which can be obtained more economically than by using painted or printed tiles. In such cases the effect may be obtained in monochrome—the joints providing the pattern—or by



Fig. 8. 'Seguradoras' building, Rio de Janeiro. Corner treatment in mosaic designed by Paulo Werneck. Architect: M. M. M. Roberto

simple colour variations in the units themselves. The illustration given here (Fig. 6) is of floor tiles designed by two Italian architects, Marco Zanuso and Alberto Scarzella, which demonstrate this point admirably.

For ordinary work it is customary for slabs to be set with broken joints as in masonry walling. This is unnecessary from the structural point of view since the ceramic skin is not load-bearing, and little, if anything, is gained aesthetically by such an arrangement. By some designers it is considered good practice to apply the units with the vertical joints running through, because such a pattern more clearly expresses the non-structural nature of the material. Such theoretical principles often provide a new point of departure for the designer; they may well lead to original variations on the traditional theme and are not to be discouraged. But the demonstration of such a principle is only intelligible to the fellow architect, the builder, and to the conditioned layman. The final effect should still be assessed objectively—it is either more or less pleasing than customary practice; if less pleasing it should be discarded, not retained merely because it happens to demonstrate a principle. Similarly, where the traditional method of breaking the joint produces a restless, dis-

turbing pattern, this too should be changed, not because it may look like stonework or because it is outmoded or unfashionable, but on aesthetic grounds. In the author's view—and opinions vary on this as on all aesthetic matters—there is little to choose between either method if the workmanship, colours and detailing are good.

An interesting variation on the usual method of plain surfacing is to enclose certain areas of tiles with a wide joint. For example, a wall surface may be divided into 5-ft. squares, each containing 100 6-in. tiles. Each square would be defined by, say, a $\frac{1}{2}$ -in. joint, while the tiles themselves might have $\frac{1}{4}$ -in. joints. This method, apart from its decorative value, may help to preserve scale in large areas of tiling. Moreover the larger size and pattern of the $\frac{1}{2}$ -in. joints, which because of their width could be more accurately drawn, distract attention from irregularities in the narrower joints and any unevenness in the surface of the tiling.

Another method of creating interest in a plain façade is to vary the depth of courses; a narrow course alternating with a deep one. This is an adaptation of masonry practice which can be quite effective in monochrome work, though it must be handled with great care if variations in colour are contemplated. Many otherwise

inoffensive buildings erected in the past sixty years or so were made hideous by unfortunate colour combinations expressed in this manner.

In 19th- and early 20th-century work courses of brickwork often alternated with courses of terra-cotta, when the clays for each material were taken from the same source and the colours matched perfectly. This again was a popular practice in the industrial north and while in certain cases a warm brown brick and slab were used, more often than not an ugly, burning red Accrington brick was combined with an equally repulsive red terra-cotta to produce a time-defying, impervious and almost indestructible face. There does not appear to be any advantage—certainly not an economic advantage—in this method of construction, although a single course of terra-cotta may save a lift of three or four courses of brickwork. One must assume therefore that the terra-cotta was introduced for aesthetic reasons, perhaps to achieve some degree of harmony between the various parts of a building, or between the façade proper and the many fanciful decorative motifs, sculpture and the like with which buildings of this period usually abounded.

Yet another effect, that of an overall texture, can be obtained by using tiles or slabs with edges either rounded or shaped to give a recessed joint. If faience is used the effect is similar to that of rusticated stonework; if small units, say 6 in. by 6 in. or 9 in. by 3 in. tiles, the result may be richer and certainly more exciting. The possibilities of this treatment have not been explored seriously in recent years, but when the cushion-edged tile is released for use in Britain interesting developments may be anticipated. As its name suggests, this tile in mass produces a cushioned, or more accurately a quilted, effect that is most pleasing. Because of the rounded edge the joints are slightly recessed so that minor irregularities both in tile and joint are less noticeable. The play of light and shade over such a surface too gains a vitality and interest lacking in the more orthodox forms.

The greatest care should be exercised in attempting to produce an effect of modelling by the use of painted tiles alone. Generally speaking this kind of pattern is inappropriate to a flat tile and three-dimensional effects should be avoided. There are cases where such designs can be employed successfully (Fig. 5), but unless skilfully handled they assume too much importance and can have a disastrous effect upon the unity of either a room or an external façade. The scale of the pattern also is important. Almost any ceramic pattern which, drawn in two dimensions, produces an optical illusion of three dimensions, is disturbing. Many floor patterns of geometrical form have this effect upon the observer. One notable example in mosaic embodying the heraldic emblems of a coastal town—waves and fish—seems to undulate in a positively frightening fashion. On a wall the illusion of modelling, of rich, deep pattern, can be

maintained by such methods only so long as it is viewed from the front, and from a distance. Many large geometrical patterns of large scale become pathetically inadequate when seen obliquely and from close at hand. If a strong texture is required, then embossed or impressed plastic tiles (which can be thicker than dust tiles), or faience slabs, should be used if economically practicable.

In selecting patterned tiles it is advisable to see groups of, say, six or eight of the same design placed together. Secondary or even tertiary themes may emerge from the overall pattern which were not clearly apparent in the single tile. If designs are submitted for approval by an artist the drawings should include, in addition to a full-sized detail in colour of one tile, a representation of a group, perhaps to a scale of one-quarter or one-half full size. The size of the pattern, whether confined to one tile or running over several tiles, must be carefully related to the total area of tiling, and indeed to the adjacent and contiguous planes or parts of the building and to the human scale. The most common fault is perhaps for contrasts in tone value between parts of the pattern to be too great so that a single element in the design dominates, producing a loose, spotty effect that may destroy the unity of a scheme. The number and size of the dominant elements also require careful consideration.

The character of a wall is produced not only by the colour, size and bonding of the facing units, but by their surface texture. Tile and slab surfaces vary from the hard, shining finish of the glazed ceramic, through softer matt and eggshell glazes to the non-reflecting, more porous unglazed types. A richer overall wall texture may be obtained by using embossed or moulded units which in turn may have any of these finishes.

Embossed or moulded tiles are rarely used in England today however except in small areas—they are not yet fashionable. But there is every indication that they will return to favour now that interest is growing in stronger colour and more vigorous pattern. It is common practice to use occasional embossed tiles to enliven a fireplace, or perhaps as an incident here and there to relieve a larger area of tiling. But the wall of embossed tiles has not yet appeared in modern European work. In this field, as in most others, South and Central America lead the way (Fig. 7).

The cost of embossed tiles may be little more than that of ordinary tiles: the only adjustment made in the manufacturing process is the insertion of a special die in the press. The die may be expensive to cut, but quantity production would render this negligible. It should be noted however that additional colours, which might necessitate more than one firing, may increase the cost substantially.

One of the most pleasing wall textures is produced by mosaic, a material much neglected by English architects, probably because of its unfortunate commercial associations or on account of its cost. It provides an admirable facing for concrete and, unlike the larger ceramics, can be

used with confidence on the underside of canopies or on ceilings.

In the 1930's there was evidence of a revival of interest in this material when the Italians used marble mosaic for railway station platforms or as a permanent facing to reinforced concrete canopies and the like. Fine decorative mosaics were used also in the Mussolini Forum, Rome. Since the war, one of the most important examples in western Europe has been the bus terminal, Dublin, by Michael Scott. In this building not only have mosaics been used for sheathing columns and facing booking offices but as rich patterns on various parts of the façade, the most striking perhaps being on the underside of canopies set high on the roof. All the patterns are geometrical.

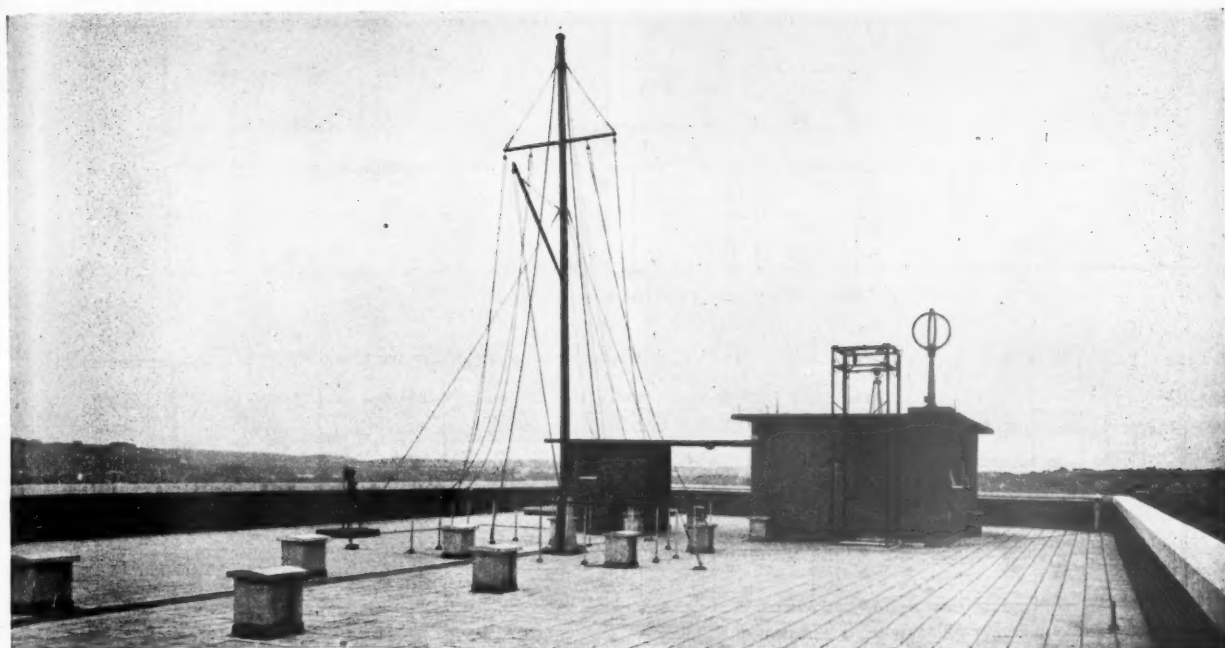
In pictorial mosaic Britain has not kept abreast of developments elsewhere. At the new Mexico University, for instance, great mosaic pictures are used as a foil to the rigid lines and rhythmic geometrical patterns of adjacent façades. They are moreover conceived as part of the architectural composition, the artist collaborating with the architect from an early stage.

In Brazil, too, exciting developments are taking place and mosaics and tiles are being used on a lavish scale. An enormous vitreous mosaic panel by Cavalcanti dominates the theatre of the Sociedade de Cultura Artística in São Paulo by architect Rino Levi. Ceramic mosaics are employed extensively for balcony walls and floors in vast apartment buildings, as for example in the Prudencia block, also in São Paulo, and also in private domestic work. In Rio de Janeiro one of the most dramatic façade treatments, that of the Seguradoras building by M. M. M. Roberto (Fig. 8), achieved by a great ogival wall of mosaic—tilelike in its detail—running through thirteen storeys; this was designed by Paulo Werneck. The entrance hall to the same building contains large mural decorations of abstract design by the same artist.

Generally speaking, it would seem that mural decoration of this kind, whether in mosaic or tiles, should be related in some way to the structural form of a building if it is to be satisfactory from the aesthetic point of view. It may cover a whole wall, be confined within a structural frame, or be used as a background to some architectural or other feature—a free-standing staircase, for example. It should not be laid as a clearly defined panel, especially if its area is small in relation to the wall surface.

Since colour values are so often distorted by the photographic medium it is necessary to be cautious in assessing the effect of work of this nature from black and white illustrations. Coloured transparencies of the buildings at Mexico University, for instance, reveal that the great mosaics which face the library, although disturbing in black and white reproductions, possess some of the qualities of fine tapestry—the pattern is rich rather than garish, and the colours harmonise well in the strong sunlight.

(concluded)



Portion of the roof over the School of Navigation

New Technical College, Plymouth

Architect: H. J. W. Stirling [A], City Architect

IN THE Plan for Plymouth an area of some 28 acres has been set aside as a cultural precinct and the college buildings will occupy the southern half. The complete project contemplates seven blocks; workshops, building and engineering, entrance and biology, housecraft, hostel, students' union and administrative. The building and engineering block is the first to be put in hand as the site allocated to it was completely devastated by bombing raids. Workshop accommodation was the most urgent requirement and it was therefore decided to include on the ground floor certain workshops until they can be transferred to the workshop block when erected.

The building and engineering block described in this article is of steel frame construction with Portland stone facing up to the first floor level string course and facing bricks above. The main windows are set in a reconstructed stone frame with mullions and transoms in the same material. The spandrels between the windows are faced with quartzite. The floors are reinforced concrete cast in situ. The floor finishes are terrazzo in the entrance halls and toilets; Altro p.v.c. tiles in corridors, classrooms and lavatories; hardwood block for staff rooms, libraries and rooms for heads of departments; hardwood strip in the general lecture room; Weyroc tiles in the building science laboratories and hardened cement screed and Weyroc in the workshops temporarily housed in the block.

The fenestration has been carried out in

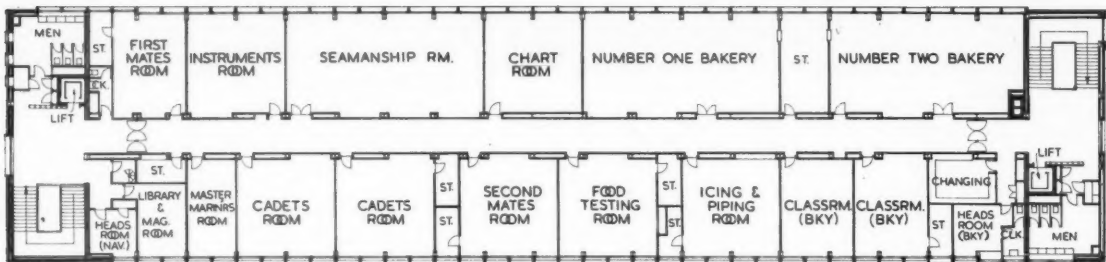


The exterior of the building and engineering block

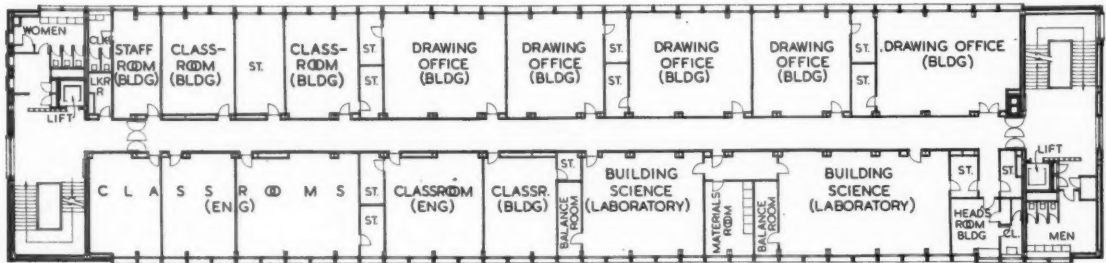
single-glazed mahogany Carda windows, oiled externally and French polished internally. The two lifts are fully automatic. Heating is by coils in the ceilings and by panels in the corridor floors, gas boilers being used temporarily until the central

boiler chamber can be put into operation. Ventilation is by mechanical extraction through ducts carried above the corridor false ceilings to vertical ducts leading to the fan chambers on the roof.

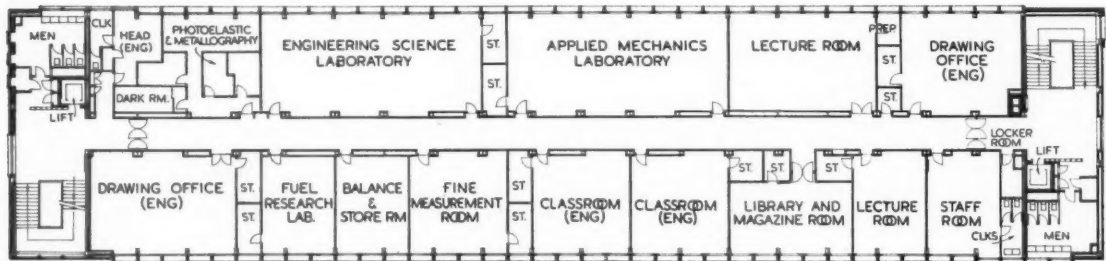
The various service mains are housed in



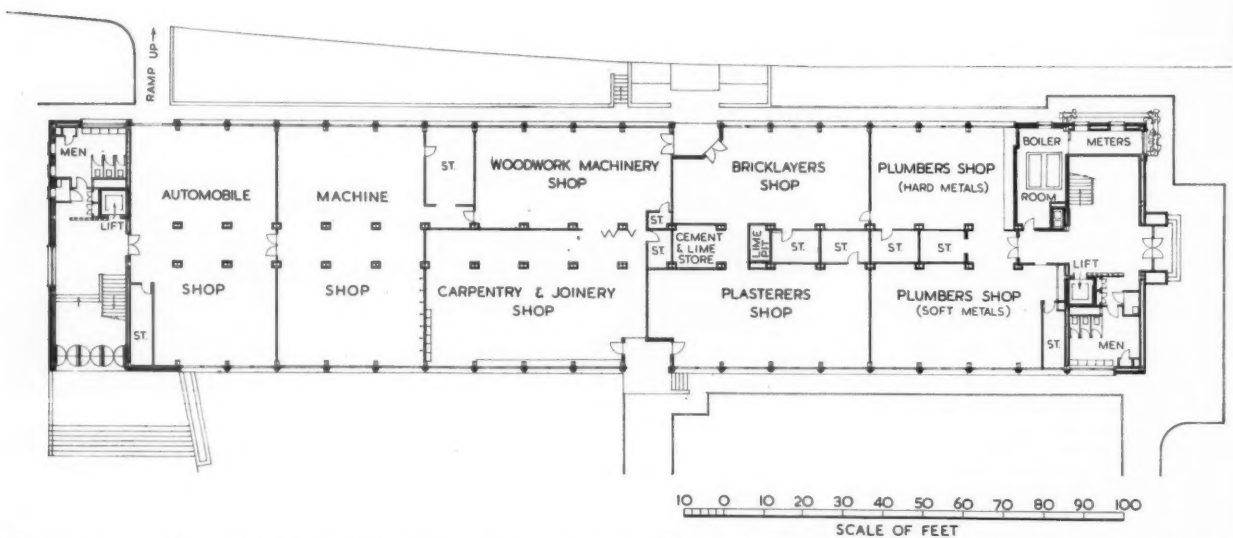
Plan of the third floor, containing the school of navigation and the school of bakery



Plan of the second floor, containing the department of building



Plan of the first floor, containing the engineering department



Plan of the ground floor. The plumbing, bricklaying, plastering and carpentry shops will be transferred to the workshop block when completed



The seamanship classroom



Engineering drawing office



Woodwork machine shop



Applied mechanics laboratory, north room



Instrument room, school of navigation

a walking way constructed below the centre of the block and extending for its full length. As the other blocks are erected through them to link up in a central chamber under the administration block. In the building and engineering block the main services are taken up in ducts at each end of the building, the supplies to the various floors being housed in wall recesses. All drainage pipes are carried down internally in accessible ducts.

The accompanying photographs were taken by Mr. Tom Molland, of Mutley Plain, Plymouth.



The emblem on the facade



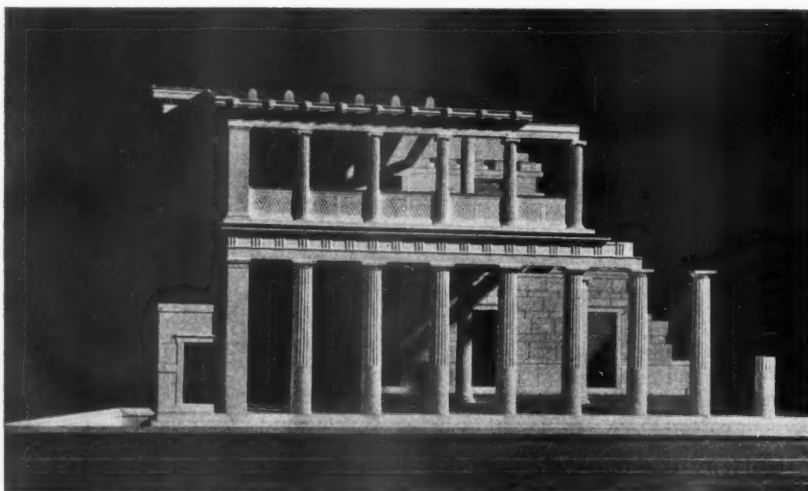
Perspective of the Stoa restored for two-thirds of its original length

The Restoration of the Stoa of Attalos, Athens

By Edward Passmore [A]

IT IS ALL TOO EASY to be cynical about the reconstruction of ancient buildings, but the modern Greek mind would seem to order things differently; the traditionalist is not a remote heir of a disintegrated inheritance, he is rather more a missionary travelling from a civilised area, the past, into a fragmentary and incoherent one, the present. Add to this the brilliant climate which reaches back to eternity (Stephen Spender's phrase is good: 'a country chiselled out of its own light') and a tradition for craftsmanship still classical, and the case for re-creating part of an architectural and cultural inheritance without equal becomes formidable.

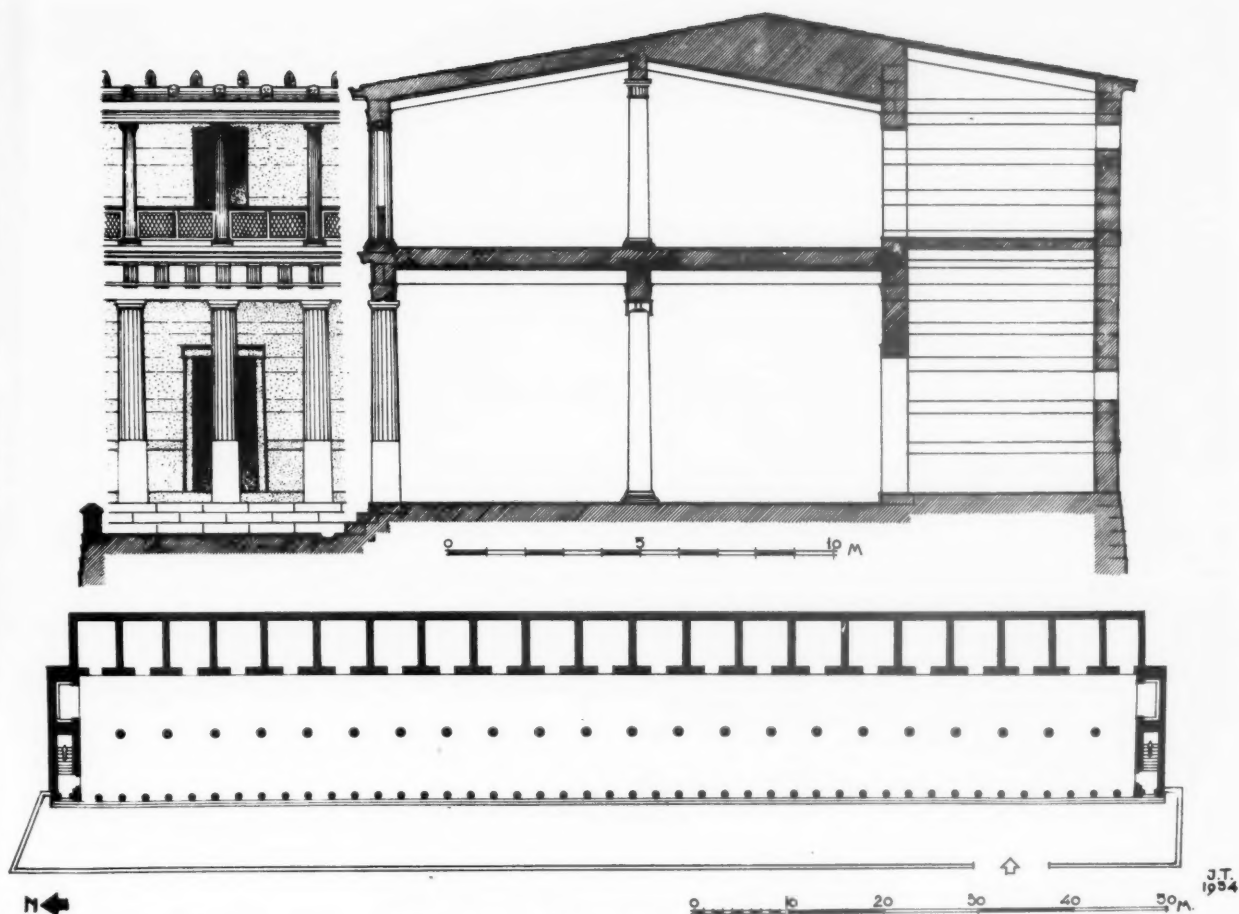
It is a commonplace that the modern world owes the most valuable elements in its civilisation to Greece, and it could be said that Athens, and the Agora in particular, was the nearest thing to the birthplace of the Western world. The Agora at Athens had almost completely gone back to nature; portions of it had been excavated for many years. But it was only after the work of the American School of Classical Studies from 1933-53 that it was decided to rebuild the Stoa in the original design and materials to house the remains found in the excavation. The restored building is being called 'The Agora Museum'.



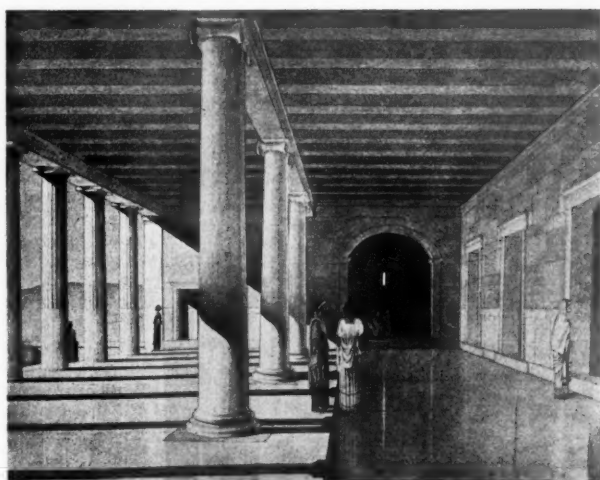
Model of the north end of the Stoa, seen from the west

Actual construction was begun in the summer of 1953. The work comes under the jurisdiction of the Department of Restoration in the Greek Government, and is partly financed (a touch of Sophoclean irony here!) by Mr. John D. Rockefeller, Jr.

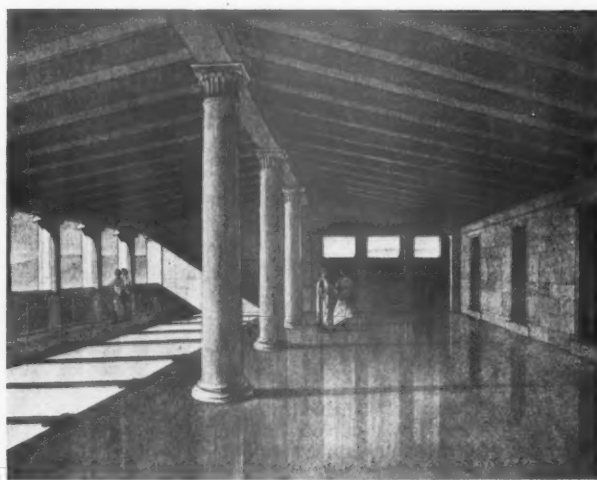
The Stoa was perhaps the most characteristic of the public buildings which bounded the market squares of a Greek city. The structure was basically one of columns supporting a roof which took its bearing from a heavy rear wall. As there



Plan, section and elevation of the Stoa as restored. The work is being undertaken by the American School of Classical Studies at Athens, Greece. Homer Thompson, Director of Agora Excavations. John Travlos, Architect of Agora Excavations. W. Stuart Thompson and Phelps Barnum, Architects.



Perspective of the restored lower colonnade, looking north. The arched opening into the exedra at the north end is the first known use of the arch in Athenian building



Perspective of the restored upper colonnade showing access to the staircase at the end. These two perspectives are from watercolours by Piet de Jong

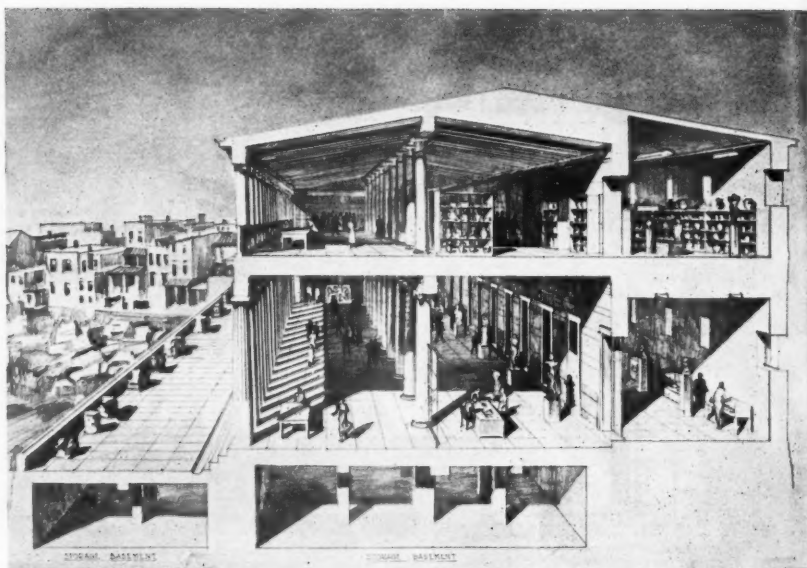


View of the model of the Stoa showing the north end and the external staircase leading to the upper storey

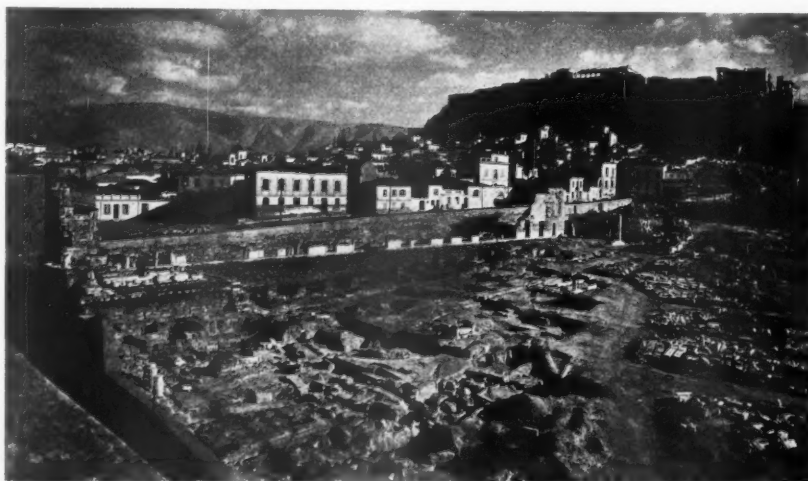
were several Stoa^e in most Greek squares—facing in different directions—shelter from the various elements in the various seasons could be found in at least one. Much of the daily life of the Greeks could be witnessed here; it formed the meeting place for philosophers, poets and artists and, of course, the mere *flâneur*—'Ἀερόβατον: so much so that St. Paul once strenuously criticised the Athenians in their Stoa life for spending 'their time in nothing else but either to tell or hear some new thing.' The Stoa was endemically Greek; here Sophocles probably wrestled with the theory of the Oedipus and Ictinus with the Ediface Complex. It was the link binding together the centuries of Greek culture.

The Attalos Stoa was not Periclean, yet although built in the second century before Christ, it remains probably superior to its predecessors. Measuring some 382 ft. in length, 64 ft. in width and two storeys high, it comprised on each floor a row of 21 rooms which looked out toward the square through a two-aisled colonnade. A broad terrace ran the whole length of the front, ending towards the south in a fountain house. The façade was of marble, both white and blue, the walls of grey limestone, the roof of terra-cotta tiles. Access to the second storey was provided by an outside stair at either end. Most of the rooms were probably used for shops. Cutting for shelves appears in some of the walls, and on the right-hand door jamb of the third room from the south is a miniature figure of Hermes, god of commerce. An inscription cut in the lower architrave of the façade records the name of the donor—Attalos II, King of Pergamon (159–138 B.C.).

About A.D. 100 the outside stairway at the south end was removed in the widening of an adjacent street: it was replaced by an inside stair in the southernmost room. Cuttings in walls and thresholds show that in later times mezzanine floors were inserted in many of the rooms, probably as dwellings for the shopkeepers.



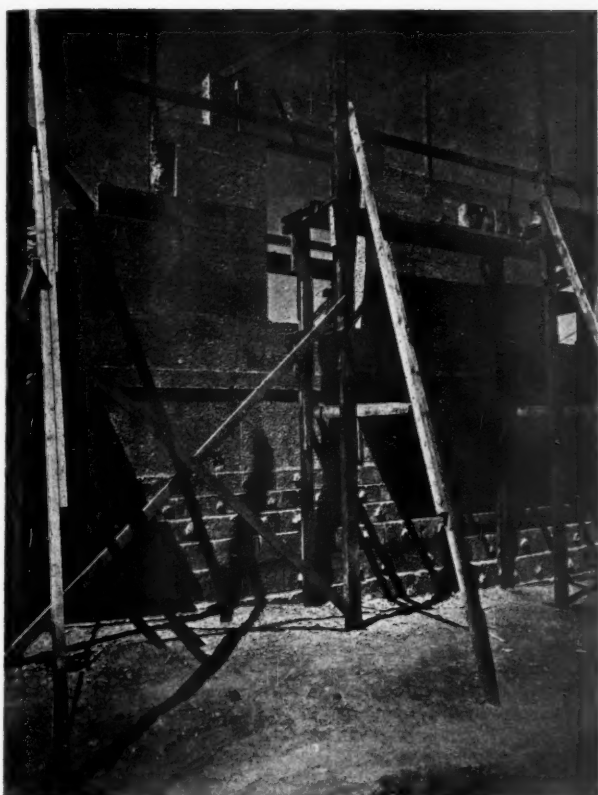
Perspective section through the Stoa illustrating its layout and equipment for use as a museum



The Stoa from the north-west before the beginning of the reconstruction



Work in progress on the marble steps which carried the front columns. Behind, doorways that led into shops at the rear of the building.



The first window lintel placed in the back wall. To give lighting for museum display, larger windows here replace the original slits. In the reconstructed shops at either end, the ancient scheme is followed



The back wall rebuilt up to floor level. At the right is the original north-east corner of the building, the highest portion which remained

The Stoa was burned, along with other buildings in the Agora, in the barbarian sack of A.D. 267, and the ruined shell was eventually incorporated in the so-called 'Valerian wall' fortification. It was excavated by the Greek Archaeological Society in 1859-62 and in 1898-1902, and further excavated by the American School of Classical Studies in 1933-53.

The money for the restoration has been provided by Mr. John D. Rockefeller, Jr., the Rockefeller Foundation, and by the trustees and other friends of the American School of Classical Studies.

The drawings of the original Stoa designs were prepared by Mr. John Travlos, a graduate of the Polytechnic School of Athens, and for some years architect of the excavations of the American School of Classical Studies.

But what, if anything, the urgent critic might enquire, does one get from it all? He might add that to reconstruct stone for stone a monument from the ancient past is sheer architectural pedantry, unethical and out of this atomic world; yet conversely there is something salutary in such an essay in architectural scholarship, especially as we are being jet propelled into the esoteric future within the ever-expanding bosom of science. This has to be; yet seen from today, the best of Greek architecture represents a period, perhaps the only period of true architectural veri-



Carving the marble columns for the lower exterior order of the Stoa. In keeping with ancient practice, the columns are set up with smooth shafts which are later channelled

similitude. Our current preoccupation with modular and dimensional co-ordination reflects something of this deep-set conviction.

Over two thousand years the basic lessons of humanistic design and rhythms

have been largely lost. We are now beginning to realise their value. Perhaps the rebuilding of the Attalos Stoa, a structure of great simplicity and strength, will help to point the way.

THIS YEAR'S CONVENTION of the American Institute of Architects, held in Minneapolis, was notable as the first at which American architects have had their attention focused primarily on planning for the community rather than the individual buildings which comprise it; but it may be remembered longest for Willem Dudok's frank and penetrating analysis of contemporary American architecture in his address accepting the 1955 A.I.A. Gold Medal.

Speaking of 'the architecture which is practically nothing else but a spatial ordering within extremely simple enclosures', Dudok said: 'I saw typical examples of this kind of architecture scattered all over your country: ambitious work, sharp, without hesitation; through unlimited material means impeccable of execution, a delight to the eye, especially to the eye of an architect who has always been obliged to work with limited means. . . . As experts you will surely know what architecture I mean: architecture with very much glass. This always more or less cerebral work I should like to call "spatial engineering". . . . I wonder if this appreciation of space is really everything, especially if human life finds sufficient expression in these essentially hard, razor-sharp buildings. I wonder if in this architecture sufficient expressive value comes to the fore and I somewhat doubt if talented younger architects will be contented with this art in the long run, and—as a modern architect I hardly dare say this—if they will not be more open to the romantic element, which after all is eternally human. . . .'

This was fairly stiff medicine for many of his hearers, but Dudok had more: 'For what do we reach, what do you reach, with this architecture. . . . What, after all, do we reach, architecturally speaking, in the joint building of our cities? The strong side of this art, the functional organisation of space, is suddenly relinquished, has nothing to say any more, is no longer an element in the construction of our cities nor of yours, nay, your cities are in general even more chaotic than the European. . . .'

But Dudok expressed the hope that 'our modern architecture, which in the separate building expresses itself so self-consciously,' might find the way to develop 'when we see the problem large and apply it to the city-as-a-whole, realising that we have to cooperate in the proper serving spirit.' He told his audience it was up to them to 'make your liberty-loving people more planning-minded' and challenged them to the creation of 'a new and really great city-planning art . . . a new culture of cities which is of this New World.'

The Dudok address was by general agreement the high point of a three-and-a-half-day convention which also included a major address by American architect and planner Albert Mayer; two seminar sessions on community planning and others on office practice and A.I.A. chapter affairs; and three long business sessions, besides election of officers, awarding of numerous honors (including 42 new Fellowships) and a number of tours—among them an all-day jaunt to a granite quarry and works the

The Annual Convention of the American Institute of Architects

By Jeanne Davern, Associate Editor, *Architectural Record*

day before the convention opened and a ten-day post-convention tour which took in Banff and Lake Louise across the border in Canada. In Minneapolis, the architects' private tours took them by the score to Eliel Saarinen's Christ Lutheran Church, completed just after his death in 1950; in nearby St. Paul they sought out the Mendelsohn synagogue. An ample program of social events included the annual President's Reception, held in the brand new office building of the Prudential Life Insurance Company (Magney, Tusler and Setter of Minneapolis, architects) and a gala *smorgasbord* supper (duly reflecting the Scandinavian antecedents of many Minnesotans!) before a special performance of the famous ice show at the St. Paul Auditorium.

'Designing for the Community' was the convention theme: a topical one at a time when the U.S., spurred by new legislation enacted last year, is embarking on its most ambitious effort ever to cope with the tangled problems of its cities. Under the 'urban renewal' provisions of the Housing Act of 1954, local communities are encouraged to undertake broad programs of long-range planning to qualify for Federal assistance not only for slum clearance and redevelopment but for 'conservation', a new catch-phrase to denote first aid to deteriorating neighborhoods which are not yet slums, and 'prevention' via strict enforcement of housing and neighborhood standards. Architects naturally yearn for a position of leadership in this vast and complex effort, but they are less than certain how to achieve it.

Albert Mayer of the New York architectural firm of Mayer and Whittlesey, planners of Kitimat and of the original scheme for Chandigarh, challenged the A.I.A. itself through its Board of Directors to search 'in a new and creative way' for an effective program of action in which the efforts of all architects could be united. Separate remedies, separately applied, cannot touch our gigantic problem, Mr. Mayer declared: 'Instead of using great new tools for a great new life, we are using them to prolong and to deepen obsolescence, painfully to prolong what should be replaced. . . . Present approaches assume we must preserve our present structure. . . . Let us make an approach the other way: analyse and visualise what we would do if we could start now in the midst of our new technological opportunities, and see what we can salvage from what we have in the light of that.' Mr. Mayer called on the Institute and its Chapters to provide the framework for the 'combined operations and expertise' which he said are needed.

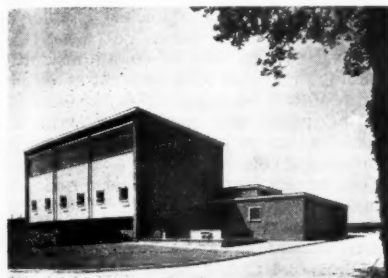
Nothing in the convention's two major seminars on planning went so directly to the point; and in one of them the cleavage between 'architect' and 'planner' which still ruffles local waters was plainly visible. 'Planning needs the architect', said John Tasker Howard, President of the American Institute of Planners, 'in five ways: as a knowledgeable designer of buildings, as a specialist in civic design, as a potential recruit to the planning profession, as a member of commissions and boards that direct the public agencies engaged in planning, and as a citizen participant in planning affairs.' Other members of the seminar on 'Rebuilding Our Cities', all architects, acknowledged the architect's responsibility in all of these areas, but preferred a broader—if less specific—definition of his role. As Robert E. Alexander of Los Angeles put it, 'The question is not "How can the architect practise city planning?"—it is "How can he practise architecture without planning?"' Carl Feiss, former government planner, now a private consultant in Washington, D.C., reproached his colleagues for not accepting their responsibility for leadership in 'the creative renewal of American cities'. And Dean G. Holmes Perkins, of the College of Architecture of the University of Pennsylvania, noted that it is 'the architect's first duty to put people back into the picture. . . . The shapes the community will take will depend on public preference but without the architect's imagination the citizen will be denied his rightful freedom of choice.'

Approaches to the expansion problems of smaller and larger urban areas, development housing and public and commercial facilities for newly developed areas were discussed in the seminar on 'The Architecture of Community Expansion'. All architects must be concerned with community expansion, said Moderator Norman J. Schlossman of Chicago: "For although each of us may never have a community, a housing development or a regional shopping center to design, everything we architects do is a form of expansion which never exists in a vacuum, but rather in relationship to its environment."

George Bain Cummings, F.A.I.A., of Binghamton, N.Y., was elected President of the A.I.A. to succeed Clair W. Ditchy, F.A.I.A., of Detroit. The honors distributed included (*in absentia*) Honorary Fellowships to Charles Herbert Aslin, C.B.E., President of the Royal Institute of British Architects, and Prof. Kay Fisker, of the Royal Academy of Art, Copenhagen, and an Honorary Membership to C. D. Spragg, C.B.E., Secretary R.I.B.A.

New Pumping Station, Sawbridgeworth, Herts

Architects: Scherrer and Hicks [FF]



Exterior of the pumping station

THE HERTS AND ESSEX WATER COMPANY have recently built a new pumping station at Sawbridgeworth to deal with the increased consumption in their area of supply of 146 square miles; an increase due in part to the building of Harlow New Town. The company now supplies more than three million gallons of water a day to 69,000 persons, a population which is increasing at the rate of about 8,500 each year; it was therefore decided to embark on a scheme of complete reorganisation.

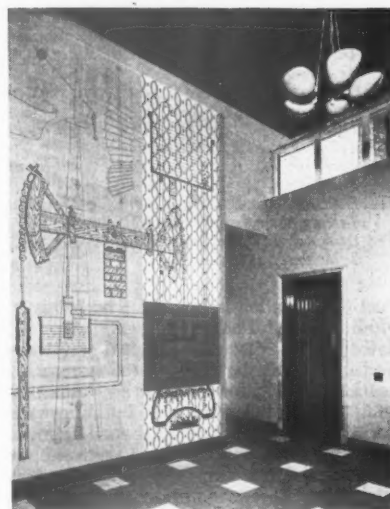
A pilot shaft 7 ft. in diameter and 170 ft. deep existed at Sawbridgeworth and it was decided to build the new pump room over this shaft.

The size of the pump room was of course determined by the layout of the equipment, and the height by the need for a travelling gantry crane, but it was thought to be desirable to keep as much equipment as possible out of the pump room in order to provide a clear space for supervision of the instruments and equip-

ment and also to permit a high standard of internal finish. Ample storage space and easy access to all pipework were other requisites and so it was decided to provide a basement to house the pipework and storage; the main floor is therefore neat and unencumbered, especially as the instrument panels have been placed along one wall but with their internal mechanism accessible from the adjoining workshop, where the panels are arranged like lockers; maintenance can therefore be done without intrusion into the pump room.

The new pumping machinery consists of electrically-driven duplicate vertical spindle centrifugal borehole pumps installed in the well and duplicate force pumps in the basement. The motors are visible in the pump room. As a stand-by in case of failure of the electricity supply, or to satisfy peak demands, a diesel engine driving a dynamo and alternator has been installed.

For this stand-by equipment the engineers designed a concrete foundation block of suitable mass and proportions to ensure stability and to provide efficient inertia damping of vibration. The block is 23 ft. 6 in. by 9 ft. 6 in. and the engineers required it to be cast in one operation, to prevent any break that otherwise might occur between the constructional layers due to vibration from the machines. As this specially-designed block would not have extended down to basement level a concrete sub-base was cast, and between the two bases Coresil insulating material was placed in appropriate positions, the spaces being filled with cork. These



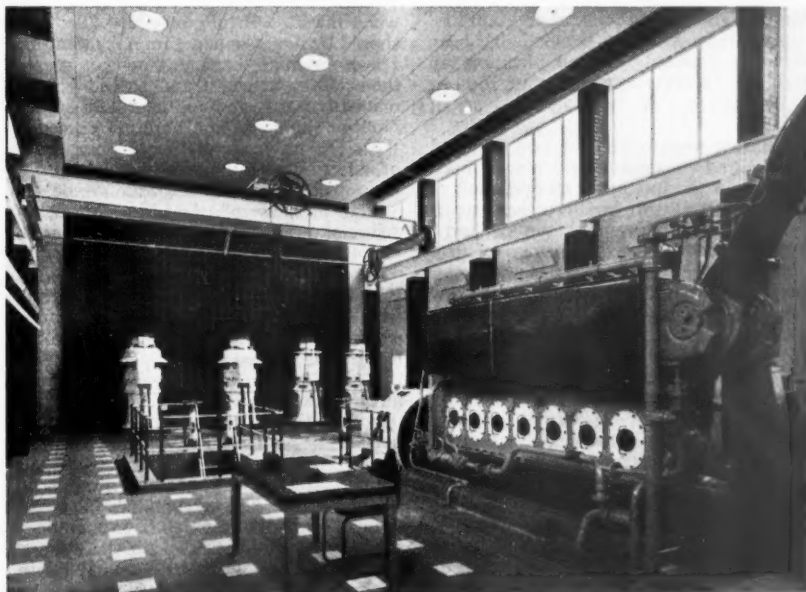
The mural in the entrance lobby

precautions against the transmission of vibration were completed by leaving a space all round the base, bridged with aluminium duct covers.

The general construction is in load-bearing brickwork with reinforced concrete floors and roof. By request the external walls have been carried out in solid brickwork, the facing bricks being pale buff and dark purple brown. The piers are in blue engineering bricks treated with linseed oil to clean building stains; this treatment has given them a blue-black colour.

The internal finishes of the pump room make a pleasing change from the usual strictly utilitarian aspect of such places; here the floor is covered with 3 in. by 3 in. blue ceramic tiles interspersed with 9 in. by 9 in. squares of white tiles; the walls are tiled to their full height in 12 in. by 8 in. glazed tiles, pale blue for the side walls and navy blue for the end walls. To reduce the noise of the machinery an acoustic tile ceiling, painted bright yellow, has been provided. Where the roof beams show beyond the false ceiling they have been coloured red, the panels between being white. The pumps are in pale cream and the stand-by diesel engine, dynamo and alternator are in pale cream and light grey, with parts picked out in navy blue and dark maroon. The architects were particularly anxious that the pump room should present an attractive and cheerful aspect and should be pleasant to work in, with the added advantage that painting maintenance should be reduced to the minimum.

In the entrance lobby there is an interesting and well-executed slip outline tile mural, designed by Mr. Kenneth Barden, A.R.C.A., A.I.B.D.



Interior of the pump room

Review of Construction and Materials

This section gives technical and general information. The following bodies deal with specialised branches of research and will willingly answer inquiries.

The Director, The Building Research Station, Garston, near Watford, Herts.

Telephone: Garston 2246.

The Officer-in-charge, The Building Research Station Scottish Laboratory, Thorntonhall, near Glasgow.

Telephone: Busby 1171.

The Director, The Forest Products Research Laboratory, Princes Risborough, Bucks.

Telephone: Princes Risborough 101.

The Director, The British Standards Institution, 2 Park Street, London, W.1.

Telephone: Mayfair 9000.

The Director, The Building Centre, 26 Store Street, Tottenham Court Road, London, W.C.1.

Telephone: Museum 5400 (10 lines).

The Director, The Scottish Building Centre, 425-7 Sauchiehall Street, Glasgow, C.2.

Telephone: Douglas 0372.

Fuel Consumption in Schools. The Ministry of Education *Building Bulletin* No. 13, dated July 1955, deals with fuel consumption in schools, based on three systems of heating; namely, forced warm air, radiators, and floor panels. As the buildings are normally occupied for only about 140 hours out of the 720 hours in a 30-day month the remedial measure to be taken against excessive fuel consumption must be the use of those heating systems that lend themselves to intermittent operation, so that when heat is not required fuel consumption is kept to a minimum. As the existing maintained schools in England and Wales consume something up to 2 million tons of solid fuel a year, and each annual building programme is adding to this consumption at the rate of about 60,000 tons a year, the subject is obviously of importance and, at the request of the Ministry, the Building Research Station has been carrying out research during the last three years.

The B.R.S. survey of schools covered 31 forced warm air systems, 108 radiator systems and 22 floor panel systems. All but two of the installations surveyed operate on hot water supplied from central boilers. The data collected about fuel consumption for the three types of heating systems are analysed in the *Bulletin* in several ways, but some of the main findings and conclusions may be summarised as follows:

(A) Coal-fired warm air systems and coke-fired radiator systems were about 25 per cent more economical in fuel consumption than coal-fired radiator or floor panel systems; (B) in nearly all cases the fuel consumptions were higher than reasonable calculations and experimental data showed to be necessary; (C) the economy of the warm air systems arose because they could be, and were, used more intermittently than the others; (D) the economy of the coke-fired radiator systems was probably achieved at the expense of comfort, satisfactory service depending greatly on the attentiveness and skill of the stoker; (E) the higher consumptions by the coal-fired radiator and floor panel systems were almost certainly due to the maintenance of high flow temperatures at nights and weekends, due to the absence or imperfect use of proper control instruments or to an

inherent inability in the system to profit from intermittent operation.

The experimental evidence shows consistently that the three systems, however operated, fall into the same order of efficiency so far as fuel consumption is concerned: first, forced warm air; second, radiators; third, floor panel systems.

The *Bulletin* may be obtained from H.M.S.O. price 2s. net.

Frozen Pipes. As the winter is approaching it may not be out of place to revive that hoar-frosty subject—frozen pipes. We all know that unless we take certain precautions some of our pipes will freeze, or the water in them will, and yet we are aggrievedly surprised when it happens.

The protection of water pipes and fittings has been made the subject of what may be called a private Code of Practice, compiled by a working party of Cambridge architects, builders and plumbers; it is believed to be the first of its kind in the world, and it has been approved in Cambridge by the local authorities, the Water Company, and the architects' and builders' organisations. Although the Code has been prepared primarily for application in dwellings, several of its recommendations would apply equally well to other types of buildings.

The code stresses that the best designed schemes and installations are not of much use without the intelligent co-operation of the householder, who should receive instructions from the relevant person or body. 'What', the code says, 'is the use of providing facilities for draining down water pipes if the householder does not know where the stop taps and draining taps are or when and how to operate them?'

The code is published by the Cambridge University and Town Waterworks Company, 4 Bene't Street, Cambridge; price 1s. An appendix gives a list of thermal insulating materials for cold and hot water pipes, with the makers' names, the composition and finish.

More about Thermal Insulation. Messrs. Bowaters Building Boards Ltd. say that they are so often asked about the economics of structural insulation in industry that they decided to summarise the

essentials of the subject in as practical a manner as possible. They have therefore produced a booklet, *The Heat Barrier*, which wastes little time on theory but gives the necessary information in language as simple as possible. A chart with graduated columns (like a thermometer) enables a rough idea to be gained of what the financial savings will be in an insulated building compared with one that is not, in terms of fuel savings, saving in cost of heating plant, and number of years in which fuel saving pays for the extra cost of insulating a new building.

The information in the booklet refers to Lloyd Insulation Board, produced by Messrs. Bowaters, and systems of fixing are described and illustrated. Messrs. Bowaters Building Boards Ltd. have their offices in Bowater House, Stratton Street, London, W.1.

Fires in Office Buildings. The Fire Protection Association's booklet No. 25, *Fire Protection Notes for Office Buildings*, mentions several possible causes of fires in office buildings, some of which would not come to the mind of most persons; for instance, one fire was caused by the sun heating and decomposing the celluloid components of the covers of a filing system.

For first-aid fire fighting the Association recommends soda/acid or water (gas pressure) extinguishers, or water buckets; a suitable scale of distribution being one 2-gallon extinguisher for every 250 sq. yds. or part thereof, with not less than two on any floor. For buckets, three of not less than 2-gallon capacity filled with water to every 250 sq. yds. or part thereof, with not less than six on any floor.

Where there are hose reels or hydrants there should be at least one to each floor. The number and distribution of reels should be such that no part of any floor protected by them is more than 20 ft. from the nozzle when the hose is fully extended. The hose should be not less than $\frac{1}{2}$ in. nor more than $1\frac{1}{4}$ in. internal diameter and not greater than 75 ft. in length and should be permanently connected to the water supply. Nozzles should have a bore not exceeding $\frac{1}{4}$ in. The water supply should be capable of effecting a discharge of at least five gallons per minute through the nozzle.

The address of the Fire Protection Association is 15 Queen Street, London, E.C.4.

Pre-plastered Roofing Slabs. The usual form of Thermacoust channel-reinforced wood-wool roofing slabs shows the rough texture of the wood-wool, but realising that some architects may prefer a smooth finish Messrs. Thermacoust have now introduced an alternative form incorporating a hard plaster finish on one side about $\frac{3}{8}$ in. thick, thus doing away with the need for in-situ plastering.

The channel edging running along each of the long sides of the slabs is in sheradised steel. In the 2 in. thick slab the channel fits closely over the slab, but in the 3 in. thickness the slab is rebated on the non-plastered side to receive the channel. The

slabs are available in 2 ft. nominal width and in lengths of 6 ft., 6 ft. 8 in., and 7 ft.

The slabs can span for their full length and are intended to form part of the roof structure, resting on purlins in the case of a pitched roof or on inverted T members for a flat roof or ceiling, and thus they combine roof structure, thermal insulation and plaster ceiling finish in one unit. It is considered that they would be appropriate for industrial buildings, church halls and the like, where the appearance of the channels might not be thought objectionable.

The slabs are rated as Class 1 in the spread of flame test.

The address of Messrs. Thermacoust Ltd. is 39 Victoria Street, London, S.W.1.

M.O.W. Visual Aids. The Ministry of Works and the Central Office of Information are preparing a series of posters to do with building, which they call Visual Aids. The first has been issued and deals with dampness in buildings. The poster measures about 40 in. by 30 in. and is illustrated with eleven photographs showing some of the causes and effects of dampness, with descriptive captions.

Others of the series, which will follow in due course, will deal with *Building Accidents, their cause; Building Accidents, their prevention; Wall Finishes, and Thermal Insulation.*

The purpose of these posters is to convey technical information in pictorial form, and it is hoped that they will be displayed on building sites, in technical colleges and in the offices of local surveyors. They may be obtained free from the Ministry of Works or from the Regional Technical Information officers in the provinces.

A New Fungicide. The Nuodex Organisation have been studying the reason for discoloration of paint and the failure of the film, particularly in buildings of high humidity, and have come to the conclusion that these occurrences are often due to attack by fungus rather than ordinary dirt; indeed they have isolated as many as 30 different fungi which flourish on paint films. As a result they have introduced a new fungicide, Nuodex 321 S.S., 'which is completely soluble in mineral spirits and compatible with emulsion paint systems, and effectively precludes such premature decorative loss of the paint'.

Messrs. Nuodex state that they have found that some paint formulations actually help mould growth, the paint serving as a source of food for the fungi. Anti-fungus paint should therefore be formulated accordingly and be reinforced with an effective fungicide.

Messrs. Nuodex claim that their fungicide is permanent and insoluble in water, and will neither evaporate nor crystallise from the paint film on exposure. The fungicides are manufactured by Messrs. Nuodex Ltd., of Birtley, County Durham, and are distributed by Messrs. Durham Raw Materials Ltd., from 1-4 Great Tower Street, London, E.C.3; 1 Booth Street, Albert

Square, Manchester, 2, and 180 Hope Street, Glasgow, C.1.

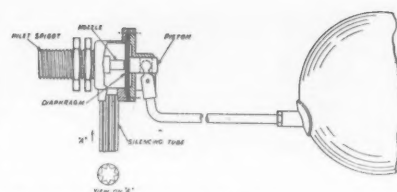
Mechanical Auger for Piling. B.R.S. Digest No. 42 dealt with the question of using short bored pile foundations in shrinkable clays, and stated that at the time of publication (May 1952) only a few suitable mechanical augers were available in this country, although others were being developed. One such mechanical auger is that of the Cementation Company Ltd., with which they are able to construct piles up to 20 ft. in depth and of diameters varying from 12 in. to 36 in. The loading that may be put on the piles varies with the nature of the soil, but it may rise as high as 50 tons. Messrs. Cementation state that as the carrying capacity of hand-augered piles is low the number required is somewhat high; on the other hand orthodox or driven piles have a higher loading value than may be needed, and are rather expensive for the lighter kinds of structures. The company claim that piles constructed with their mechanical earth auger meet the 'in between' need and, coupled with footings designed in accordance with the B.R.S. recommendations for composite beams, provide an economical foundation.

The address of the Cementation Company is 39 Victoria Street, London, S.W.1.

Ball-valves. For some time past the Building Research Station has been carrying out research on that humble fitting the ball-valve, which does its work unseen but by no means unheard. For many years we have borne with the hissing noise that comes from these valves, which is regarded by most people as a nuisance and by some a source of embarrassment.

But it was not noise, and certainly not prudery, that led to the research; rather was it evidence that the too-frequent replacement of defective ball-valves involves property-owning bodies in considerable annual expenditure. In a paper printed in the March 1955 JOURNAL OF THE INSTITUTION OF WATER ENGINEERS, Mr. A. Sobolev, B.Sc.(Eng.), of the B.R.S., states that some 1½ million ball-valves have to be replaced in this country because they fail to function, thus causing waste of water, inconvenience and expense. The number of valves in use in this country is estimated to be between 15 and 20 million. In one two-year old housing estate of some 3,000 houses the present rate of replacement is 60 to 100 per week, and it is expected that every one of the 6,000 valves will have to be renewed after two to three years' service. Inquiries received at the B.R.S. from plumbers, local authorities and householders show that the problem is widespread.

It has been found that cavitation is one of the main causes of damage to a valve. Cavitation is defined as 'the formation in a fluid of a vacuous space which is filled with vapour', but for the present purpose this definition may perhaps be taken as a scientific colloquialism for 'air bubbles in water'. The destructive action of cavitation is a mechanical one caused by the impact of liquid masses, involving pressures of



The B.R.S. prototype ball-valve

the order of 60 tons per sq. in. as the air bubbles collapse on reaching a zone of high pressure, and it is this collapse that causes both excessive mechanical wear and the familiar hissing or sizzling noise.

After research on the types of ball-valves most commonly used the B.R.S. has evolved a prototype in which the maximum noise intensity is about one-third of that caused by an average B.S. 1212 valve under similar conditions. Its main feature is a diffuser seating, preferably of stainless steel, which is closed by a small piston through a rubber or plastic diaphragm. This diaphragm separates the waterway from the moving parts of the valve and eliminates the danger of a sticking piston and also provides an unrestricted large area over which the water can freely flow outwards. The valve outlet has a long star-shaped on section silencing tube. A plastic float has a simple height-adjusting device such as an eccentric boss. Data on the life of this new valve are not yet available.

Pre-production models have now been approved for normal and accelerated performance tests.

The Modular Catalogue. The fourth issue of the Modular Catalogue has now been issued. The issue comprises sheet No. 17, Messrs. Sommerfeld's lattice girders for roofs; No. 18, Messrs. Gardiner, Sons and Company's Thermagard Mark III system of steel framework; and No. 19, Messrs. Halcrete (Precision) Panels Ltd. structural roof panels.

British Standards Recently Published
B.S. 1250. Parts 1, 2 and 3. 1955. **Domestic Gas Appliances for immediate Post-War Housing.** This Standard was first published in two parts in 1945 and 1946; it is being revised and will eventually comprise six parts, of which the first three have now been published.

Part 1 deals with general requirements for the construction and performance of appliances, including methods of test. Part 2 comprises specific requirements for cookers, hot plates, grills and boiling burners and includes performance tests. Part 3 deals with the specific requirements for water heaters other than wash boilers and washing machines, and with the design and performance requirements for the various types of water heaters, instantaneous heaters, storage heaters, circulators, central heating units and bulk water heaters.

The Standard applies to domestic appliances using town gas but does not cover their installation. The price of each part is 5s.



Report of the Fourth I.U.A. Congress

Read by J. P. Kloos, Rapporteur-General, at the closing Session at The Hague,
16 July 1955

The programme of the Congress was divided into five themes, dealing with the following aspects of housing: 1. Programme. 2. (i) Individual plans. (ii) Rationalisation of projects. (iii) Equipment. 3. Production. During the discussions, the Committees on 2 (i) and 2 (ii) agreed to hold their meetings together since these subjects are difficult to deal with separately. For the same reason they have produced a joint report.

Before beginning my report I should like to express a personal opinion. It is evident that our Congress has worked on themes of great importance in the realm of housing *pro habitatione*. We set out to compare, standardise, unify, document, analyse, industrialise and so forth. Our conclusions generated still further comparisons, documentations, etc. We are all agreed that up to the present not enough thought has been given to this kind of activity, but from time to time one is faced with the question: 'Is a limit to be set to this kind of activity and, if so, where?'

I know that this question has been very much in our minds throughout the Congress, but I would like none the less to underline it now. Analysis and documentation must be for the architect not an end but a means, a servant of his imaginative gift for expressing structurally the relationships between human beings, a necessary adjunct to his sensitivity to space-values, form and colour as integrated and integrating elements, an instrument of that sensitivity which like all our faculties requires constant exercise and like all our faculties clamours continually for perfection.

We know that we cannot be satisfied with anything short of perfection if we are to achieve a wholly humanised beauty, a beauty, moreover, which can stimulate positive response in man, and which he will ultimately find as necessary as physical nourishment. So it happens that although the objects of all the recommendations formulated by this Congress are necessarily sometimes very arid, we are all aware that the permanent values on which architecture rests must remain our chief preoccupation. Beauty will never forfeit its rights.

Now I am going to read you the reports and I propose that they be accepted as resolutions of the Congress. *First:*

Report of the Committee on Programme.
President: A. Vlassov (U.S.S.R.). Rapporteur: S. J. van Embden (Holland).

1. The Congress proposes to take for its basis the text of the 'Universal Declaration

of the Rights of Man', published in 1948 by the United Nations which in article 25 pre-empted for the human being the right to a dwelling-place. Every individual is entitled to a home.

It then becomes necessary to define the term 'home'. The home is that space which satisfies at the same time the spiritual, sentimental, and material needs of the individual and his family. Since a dwelling is not a privilege but an essential right, it cannot be dependent on any economic contingency. No one may be deprived of it on any pretext whatever.

2. Those Governments who are pledged to implement the Declaration of the United Nations must accept responsibility for the housing of those persons under their administration and must approve programmes of construction, setting aside in their budgets the sums necessary for their realisation.

3. Programmes of construction fit logically into the framework of general programmes of national development. They form part of integral planning and can be made part of the requirements for national, regional and local plans. Housing itself, being inseparable from the multiplicity of buildings necessary for the practice of living in a society, can only be conceived within the framework of housing in organised, residential units, including schools, cultural centres, shops, places of worship and so forth. Within existing towns the renewal of housing must be conceived in entire neighbourhoods and not in patches or small isolated blocks.

4. It falls to architects to design housing, but it is the duty of governments to regulate the construction of dwellings in such a way as to avoid the abuses to which private enterprise is subject and the squandering of national resources. All legislation must be based on a sociological enquiry, broad in scope, taking into account the special needs of the populations concerned as well as the factors fundamental to the country.

Technical regulations must be drafted in a form that leaves architects the greatest possible freedom to create. This is in the interests of the users since progress in the realm of housing can only result from a continuous programme of research pursued by the profession.

5. The Congress hopes that the I.U.A. will undertake in collaboration with the housing committee of the United Nations and the I.F.H.T.P. a comparison of national legis-

lation in housing and town planning as a means of achieving a systematic definition of actual standards—the first step must be the establishment of an international terminology.

6. The standards at present in use having proved themselves more often than not inadequate to satisfy human needs, it would seem that future programmes must consider how to make the best possible use of houses already in existence. The investments authorised must be redeemable within the practical life of the dwellings.

Taking into consideration the whole body of problems concerned with construction, it appears that the notion of flexibility in time and space must play its part in the conception of any programme that is to permit the human being to satisfy his individual aspirations within the framework of collective housing, and preserve for our contemporary creations the maximum efficiency in the future.

Secondly, 2 (i) and 2 (ii):

Report of the Commission on Individual Plans. *President: C. Kitsikis (Greece). Rapporteur: P. Sirvin (France), and of the Committee on Rationalisation of Projects.* *President: G. Ciribini (Italy). Rapporteur: Mme. Helena Syrkus (Poland).* The fourth Congress of the I.U.A. has analysed the problem of the rationalisation of housing. The Congress recommends to architects and to public authorities in every country that they use their best endeavours to develop normalisation and typification of the elements of construction within the framework of modular co-ordination, in order to promote the industrialisation of building. This will make it possible to overcome the lag in housing which is such a grave problem throughout the world and at the same time to obtain more rapidly better buildings at a lower price while allowing to their designers the time necessary for research.

Normalisation and typification of elements in construction must not be a hindrance to the architect, but must allow him freedom to draw up well-organised and well-proportioned plans in the spirit of his national culture. The drawing up and use of type-plans must be envisaged in each country as a function of economic circumstances and the scale of production, and they must be subjected to continuous reconsideration.

It is essential that the development of normalisation and typification within the realm of housing be fully supported by continuously evolving scientific research in

order to resolve the technical, social and economic problems in such a way as to satisfy human aspirations towards comfort, order and beauty.

With this end in view the Congress recommends to all national sections that they do their utmost to encourage building research in their respective countries with a view to studying the problem of housing for the largest possible numbers. The experience gained in so doing should be exchanged through the publications of the I.U.A. and by all other means.

The Congress wishes the Housing Committee of the I.U.A. to collaborate actively with other international organisations, particularly the Housing Committee of the United Nations and of the International Standards Organisation. The Congress considers that modular co-ordination is the basis of industrialisation in building, and while recognising the value of the work carried out by the I.U.A. Housing Committee and other organisations, *recommends* to all national sections that they augment their activity in this field and give the widest possible circulation to their conclusions.

Also secondly, 2 (iii):

Report of the Committee on Equipment.
President: G. Goulden (Great Britain). Rapporteur: H. Schozberger (Germany).

Resolution 1: The Congress recommends
(1) That every dwelling should contain a precisely defined minimum storage space.
(2) That this minimum space should be 4 cub. metres plus 1 cub. metre per person. This space to be indoors, exclusive of any space more than 3 metres above floor level, and exclusive of storage space for bicycles, prams, fuel, etc. The minimum storage space to be 5 cub. metres.

Resolution 2: It is accepted that washing of linen will be done in the kitchen or the bathroom, but proper equipment and drying arrangements should be provided.

Resolution 3: A separate w.c. should be provided where there are more than three persons in the dwelling.

Resolution 4: Interior bathrooms and kitchenettes are permissible if adequately ventilated. Any other type of kitchen must be naturally lit and ventilated.

Resolution 5: The Congress recommends that all fixed installations, and in particular piped services for fluids, should be so installed that extensions and modifications can be made when needed.

Resolution 6: The attention of the International Standards Organisation is drawn to the need for more rapid standardisation of kitchen and sanitary equipment.

Resolution 7: For buildings with more than three floors above ground level, some form of built-in rubbish disposal system is essential.

Resolution 8: The Congress has established definitions for various types of kitchens,

bathrooms and laundries in French, English, Spanish and Russian. These will appear later.

Thirdly:

Report of the Committee on Production.
President: A. Grumfeld (U.S.). Rapporteur: H. van Kuyck (Belgium). 1.0. On the technical aspect of the problem the Congress notes:

1.1. That in most countries architects and builders in general are taking an interest in the industrialisation of buildings; some extremely interesting and encouraging exploratory work has been undertaken in various countries, but this has so far been of an experimental and fragmentary nature.

1.2. That nearly all members of the profession and users of housing are still not aware of the advantages, social as well as economic, which can result from this kind of industrialisation—it is imperative that the attention of both groups be drawn to its potentialities.

1.3. That in most cases this exploratory work is still being directed towards the series production of a project more or less traditional in character and carried out by semi-traditional methods. Such projects, however interesting, are not to be confused with those resulting from industrialisation as it is understood in the following remarks.

1.4. That an analysis of experience of members in the field of industrialisation shows that the problem has been approached in two ways: (a) The mass production of a carefully worked out prototype designed with an eye to its function and to the requirements of large scale industrial mass production. (b) The large scale mass production of interchangeable elements which the architect will build up into a composition. The interchangeability of such elements must necessarily be ensured by a system of modular co-ordination of elements.

1.5. The Congress *recommends* that a detailed simultaneous study of these two methods be undertaken and energetically pursued (see 1.4 above).

2.0. On the legal and administrative aspects of the problem the Congress notes:

2.1. That local regulations governing construction and the methods of granting approval still in force are among the greatest obstacles to the introduction of industrialised methods of construction.

2.5. The Congress *recommends* that every effort should be made to draw attention of public and other competent authorities to the urgent need for a modification of these legal provisions to make it possible to extract from industrialisation all the economic and social benefits which it promises.

In conclusion

3.5. the Congress *recommends* that a committee be set up to make a study of these

problems. As a matter of urgency it is suggested:

3.5.1. That it should undertake a study of the new terminology and of the basic definitions which are needed in view of the limited international vocabulary of these terms.

3.5.2. That scales should be established to allow a comparison of the results achieved by different methods and in different circumstances.

3.5.3. These studies must be undertaken by the international organisations concerned.

After these reports had been read they were accepted by the meeting as resolutions.

Practice Notes

Edited by Charles Woodward [4]

IN PARLIAMENT. City of London (Rebuilding). Sir A. Bosson [F] asked the Minister of Housing and Local Government if he will consider establishing a commission to co-ordinate all the interested authorities who can supervise the design of the buildings to be erected around St. Paul's Cathedral to prevent a further development of incongruous structures out of keeping with that important situation.

Mr. Sandys: Proposals for the rebuilding of the area around St. Paul's contained in the County of London Development Plan did not seem to be adequate having regard to the world-wide importance of this site. I consequently asked that the matter should be reconsidered with a view to providing a more worthy setting for Wren's masterpiece.

Since then the Corporation of the City of London have, in agreement with the London County Council and with my full support, appointed Professor Sir William Holford as planning and architectural consultant to prepare revised proposals. With the object of giving necessary guidance to the consultant, a small committee has been formed composed of the Chairman of the City of London Town Planning and Improvements Committee and the Chairman of the Town Planning Committee of the London County Council, with myself as Chairman.

The Committee has had regular meetings and has been assisted by a number of leading architects who have put to the Committee their views as to how the problem should be treated. The City Corporation is in touch with the owners of the sites around the Cathedral with a view to ensuring that, as far as possible, any new buildings in this area will be in harmony with whatever overall scheme may be adopted. I am hopeful that the consultant will be in a position to submit a new plan to the City of London Corporation in the autumn (28 July 1955.)

MINISTRY OF HOUSING AND LOCAL GOVERNMENT: Green Belts. Circular 42/55 dated 3 August, addressed to local planning authorities in England and Wales, refers to a statement by the Minister in the House of Commons on 26 April, in which he said that apart from some limited rounding-off of existing small towns and villages, no further expansion is to be allowed within a Green Belt, some 7 to 10 miles deep, provided for in Development Plans submitted by local planning authorities for the Home Counties.

The circular states that the Minister is satisfied that the only really effective way to check the unrestricted sprawl of the built-up areas is by the formal designation of clearly defined Green Belts around the areas concerned. Planning authorities are therefore recommended to consider establishing a Green Belt wherever this is desirable in order to check the further growth of a large built-up area, to prevent neighbouring towns from merging into one another, or to preserve the special character of a town.

Wherever practicable, a Green Belt should be several miles wide so as to ensure an appreciable rural zone all round the built-up area concerned.

Inside a Green Belt, approval should not be given, except in very special circumstances, for the construction of new buildings, or for the change of use of existing buildings for purposes other than agriculture, sport, cemeteries, institutions standing in extensive grounds, or other uses appropriate to a rural area.

Apart from a strictly limited amount of 'infilling' or 'rounding off' (within boundaries to be defined in Town Maps) existing towns and villages inside a Green Belt should not be allowed to expand further. Even within the urban areas thus defined, every effort should be made to prevent any further building for industrial or commercial purposes, since this, if allowed, would lead to a demand for more labour, which in turn would create a need for the development of additional land for housing.

A Planning Authority which wishes to establish a Green Belt in its area should, after consulting any neighbouring Planning Authority affected, submit to the Minister as soon as possible a sketch plan indicating the approximate boundaries of the proposed Belt. Before officially submitting their plans, authorities may find it helpful to discuss them informally with the Ministry either through its regional representative or in Whitehall.

In due course a detailed survey will be needed to define precisely the inner and outer boundaries of the Green Belt, as well as the boundaries of towns and villages within it. Thereafter these particulars will have to be incorporated as amendments in the Development Plan.

This procedure may take some time to complete. Meanwhile it is desirable to prevent any further deterioration of the position. The Minister therefore asks that where a Planning Authority has submitted a sketch plan for a Green Belt, it should

forthwith apply provisionally, in the area proposed, the arrangements outlined above.

The Circular is obtainable at H.M. Stationery Office, price 2d. net.

NATIONAL JOINT COUNCIL FOR THE BUILDING INDUSTRY. Tool allowance for plasterers. As from 1 August plasterers while manually performing plastering work with their own tools and producing, on all necessary occasions, the tools prescribed in an approved list, are to have a tool allowance of 2d. per day.

Plasterer apprentices who are put to the expense of maintaining tools are also to have a tool allowance of 2d. per day.

The list of tools required to be provided and maintained by plasterers under the amended Working Rule 3E(d) has been agreed and approved.

The amended Rule does not cover men using automatic or other tools supplied by the employer.

Regrading of Districts. The Council have authorised a regrading of districts in the following areas as from 3 October 1955. The regrading will result in an increase in wages and in current contracts under the R.I.B.A. Form of Contract will be a net addition to the Contract Sum.

The areas are Midlands Region, Yorkshire Region, Northern Counties Region, Mid- and North Northumberland, North-West Durham, Middlesbrough, Bishop Auckland, Darlington, Southern Counties Region, Chatham District, Maidstone, Sevenoaks, Aldershot District, Banbury, Bourne End District, High Wycombe, Beaconsfield District and Maidenhead.

(Note. The list is too long to insert here, but could perhaps be seen at the local Regional office of the Council. Contractors would have the full list.)

ROYAL INSTITUTION OF CHARTERED SURVEYORS: Professional Charges. The Institution has been informed by the Ministry of Works that a new scale of fees came into operation with effect from 6 June 1955, and that the scale also applies to work undertaken for the three Service Departments. The Institution has informed the Ministry of Works that it is prepared to advise its members that instructions for work from the Ministry of Works, the Admiralty, the War Office and the Air Ministry may be accepted on the conditions of employment and the scale of fees.

Copies of the conditions and the scale of fees are issued on appointment by the Ministry or Department concerned and are not obtainable from the Institution.

THE ROYAL SANITARY INSTITUTE. Change of Title. As mentioned in the JOURNAL for August (p. 398), in future the Institute will be known as the Royal Society for the Promotion of Health.

Present Fellows, Members, Associates and Affiliates will, in accordance with customary procedure, retain the right to use the present designations if they so wish or use the new designations, i.e. F.R.S.H., M.R.S.H., A.R.S.H., Affil.R.S.H.

SCOTTISH HOUSING HANDBOOK: PART V. Tendering for Local Authority House Building. The principles which should normally be followed in taking tenders and in drawing up specifications and schedules of quantities for local authority house building are set out in Part 5 of the Scottish Housing Handbook, issued to local authorities by the Department of Health for Scotland (H.M.S.O. price 1s. 6d.).

Part 5 of the Handbook contains information about various aspects of tendering procedure, statutory requirements in conditions of contract, price variations in tenders, and the preparation of specifications and schedules of quantities.

A general specification—replacing the Department's pre-war 'General Specifications for State-aided Housing'—forms Appendix 1 to this part of the Handbook. This general specification is not exhaustive, its purpose being to assist local authorities and their technical advisers by indicating generally types of materials and standards of workmanship and efficiency appropriate to the normal local authority house.

To ensure an appropriate standard of materials and workmanship this part of the Handbook recommends that specifications and schedules of quantities should, wherever possible, refer to the appropriate British Standard Specifications and Codes of Practice. Appendix II lists the British Standards and Codes of Practice suitable for housing work.

Other parts of the Scottish Housing Handbook, dealing with siting and layout of houses, roads and services, house design and equipment, and administrative procedure, have already been issued. (28 July 1955.)

MIDDLESEX COUNTY COUNCIL. New proposals for control of development. The County Planning Committee have recently been considering the growing pressure for industrial development in the County and the need to restrain the increase of population. The ratio of vacancies to unemployed has increased over the past three years, and if employment opportunities are greater in the County than in most parts of Great Britain it may be difficult to prevent a rise in the population with consequent demands for yet more houses which cannot be met on the limited residential land still remaining vacant. The difficulty of getting workers to and from work, the congestion of cars and bicycles on the roads in the morning and evening rush hours and the handling of traffic generated by the factories, point to the need for further examination of the case for more careful control of the density of industrial building. It may also be against the best interests of industrial undertakings if it becomes more and more difficult to get the labour they require.

To this end the Committee propose that industrial development in the County should not exceed a plot ratio of 1 : 1 on land allocated for industry in the development plan, should not exceed a plot ratio of 0.5 : 1 on land not allocated for industry, and should not cover more than

75 per cent of a site at ground level, except where a comprehensive development area map provides otherwise or where there are special circumstances satisfactory to the local planning authority.

It is stated that pilot surveys had shown that in newly developed industrial estates the plot ratio of 1:1 was rarely exceeded and that the average for fully developed sites was between 0.7 and 0.8. On estates of this density there was little congestion of traffic, though parking might become a problem if more employees used cars. The suggested 75 per cent limit on site cover is to avoid road congestion, as part of each site would be left open for parking space and for loading and unloading.

The Committee add that until a country-wide survey has provided more basic data, these plot ratio standards and coverage limits should be regarded only as general figures to which to work.

Book Reviews

A Biographical Dictionary of English Architects 1660-1840, by *H. M. Colvin*. 8½ in. xiv + 821 pp. Murray. 1954. £3 10s.

One's sense of perspective can, I feel, go awry after solemnly reading several pages of any dictionary, and therefore I must confess at once that I cannot claim to have read this book, already known to architectural historians as just *Colvin*, from cover to cover. In no way should this confession be taken as an allegation that this is a dull book; quite the reverse, for *Colvin* is a veritable feast of fascinating information, a vast collection of facts, many of them known but many more unknown.

Admiration of Banister Fletcher is tempered, more often than not, with the student's usual aversion from anything approaching a text-book. None of the three important books published in the last two years: Summerson's *Architecture in Britain 1530-1830*; Harvey's *English Mediaeval Architects*, and *Colvin* can be regarded as text-books, even though they cover between them a huge section of British architectural history.

Colvin falls between the two others in that he is as readable as Summerson—or almost so—and yet as systematically informative as Harvey. In the advertisement explaining the scope of his research *Colvin* might mention profitably, in the next edition, his procedure with regard to those architects who were also engineers. Curiously enough, he has included bridges and even those buildings auxiliary to docks in the lists of works, but has omitted those buildings that formed part of the numerous canal schemes. Also, he includes all Scots, Welsh and Irish, as well as those foreign architects who worked primarily in England, and lists their major works in their native land. Excellent though this is as far as it goes, it must perforce leave us awaiting biographical dictionaries of those British architects who practised in countries other

than England, as well as the early civil engineers—for Smiles is long since obsolescent.

Colvin will need constant revision to keep abreast of the continuous burrowing that regularly reveals little molehills of further information. In fact the numerous tunnels that *Colvin* will be responsible for starting may be legion already. Indeed, all those who indulge in architectural detection will deem it their pleasure to assist Mr. *Colvin* by sending him the results of their work, so that the reliability and accuracy of the dictionary may remain unimpaired in each succeeding edition.

I have stumbled across a few inaccuracies in course of reference to my *Colvin*, but these are more than compensated by the abundance of extraordinary information provided; and it is most exciting the way one snippet connects with another, thereby making part of the jigsaw slip into place.

The introductory review of the building trades and the subsequent one of the profession show clearly the emergence of the architect from the masonic chrysalis. Harvey elucidated this period of the embryonic architect which, apart from the hundred years' gap so ably covered by Summerson, *Colvin* now shows from birth onwards as a professional. In one instance he falls into his own trap when he quotes George Nicholson as being 'architect to the Dean and chapter of Durham', when it seems that he was, in fact, a contracting mason.

There can be little doubt that *Colvin* is destined for as many editions as Banister Fletcher, and will prove complementary to the latter, yet no less indispensable.

CHRISTOPHER GOTCH [4]

A History of Egyptian Architecture, by *Alexander Badawy*. Vol. i. 9½ in. xv + 212 pp. incl. pls. + front. + viii pp. of illus. Giza: pub. by author. 1954. £2.

A comprehensive work on this subject has been lacking, the relevant chapters of Banister Fletcher's *History* being now out of date, and it is pleasant to meet with a description, however brief, of some of the early temples (e.g., that of the Sphinx). Perhaps in the subsequent volumes of this work Dr. Badawy will deal in some detail with those masterpieces of the Seti period which are described but not illustrated in the current edition of Banister Fletcher.

The author has re-examined the 'texts', hieroglyphs and graphical evidence generally, in order to compare them with the monuments that have been excavated up to the present time. He refers to the sign for 'Palace-façade' and compares it with a type of external wall treatment found at Saqqara in Zoser's masonry, which persists and is akin to Mesopotamian work at Ur. Some comment on the contact of the two civilisations would have been welcome.

One notices that a type of ornament symbolising strength or stability, and often occurring as a window motif in the internal surfaces at Saqqara, is called Djed by Dr. Badawy, and interpreted as the

styling of a shook sheaf of reeds. Is not this type usually known as the 'Spine of Osiris' and the related hieroglyph as the Dad sign? Dr. Badawy uses Egyptian and Coptic terms alternatively.

Restoration work is described, and a most interesting example is given, the Sun Temple (shown on pp. 117-21), where the mass of the original structure was restored by Borchardt from the remains of the base, an ascending ramp and the compound hieroglyphs, viz., the obelisk sign for a sun temple.

Dr. Badawy presents his evidence clearly, following for the most part the chronology of J. H. Breasted. The eight photographic plates are well chosen and have the merit of being fresh. The drawings, in rather dry pen-and-ink technique, do justice alike to the frail materials of mat, reed-bundle, spar and mud brick, the small stone masonry of the third dynasty, and the megalithic construction that followed. On p. 60 there is a good ink drawing, and in general the re-drawing of material from other sources is well done and makes for ease in reading.

Cecil J. Searle [4]

St. George's Fields [Southwark]. The Parishes of St. George the Martyr, Southwark, and St. Mary, Newington. By *Ida Darlington*. Survey of London, xxv. *London County Council*. 11½ in. x 8½ in. 1955. Price £2.

Since the war the plan of the Survey of London has been considerably modified by the inclusion of all important buildings irrespective of the date of their erection. The present volume, together with that entitled *Bankside* (Vol. xxii in the series), completes a detailed and stimulating record of the Borough of Southwark.

Five of the twenty-eight metropolitan boroughs, Chelsea, Hammersmith, St. Pancras, Shoreditch and now Southwark have been covered, and the second and final volume on Lambeth is in hand for publication next year. Parts of Holborn, the City, Westminster and Poplar have also been dealt with in the twenty-five volumes issued since the London Survey Committee was founded as a voluntary body in 1894, and there are also fifteen monographs on buildings of outstanding interest.

In 1953 however it became evident that advancing years and a lack of young and active recruits made some new arrangement necessary and the London County Council, which had helpfully co-operated from the start, took over all the functions of the Committee. Miss Ida Darlington, the Council's Librarian, has risen splendidly to the occasion in this, the first production of the new régime.

We are so accustomed to the spate of shoddy and repetitive topographical books that the vivid and authoritative detail given here comes as a shock, for we see the real Southwark in its buildings and its people; in the early days and then the rapid expansion of the late eighteenth and nineteenth centuries, the prisons, the

churches, nonconformity, the varied charitable institutions and the transition from the Georgian terrace to the Victorian street. Some 200 photographs, drawings and plans are given of these buildings which, with brief but incisive details of their owners recreate a living past.

Blemishes are few, but the writer would have liked to see a more complete pictorial record of St. Agnes, Kennington, since this and All Hallows, Southwark, were the only London churches designed by that Victorian genius, George Gilbert Scott, junior, and both are ruined by bombing.

Apart from six days in June 1780 when some 60,000 followers of Lord George Gordon made their headquarters in St George's Fields and rioted to their heart's content, or for some days of apprehension in 1848 when the Chartists were planning their meeting on Kennington Common, it is a peaceful story, but that does not imply dullness, as a glance at the index will quickly show.

W. W. BEGLEY [L]

Motels, by Geoffrey Baker and Bruno Finaro. (Progressive architecture library.) 11½ in. v + 264 pp. incl. pp. of illus. text illus. New York: Reinhold Pubg. Corp.; Lond.: Chapman & Hall. [1955.] £4 16s.

Motel, an abbreviation of motor hotel, is a newly-coined word, but the building it describes has an age-long tradition in accommodating the traveller—in past centuries the coach passenger, in modern days the motorist.

The importance which motels have gained in American hotel business is shown by the fact that by now there are over 70,000 in the States, as opposed to just half as many traditional hotels. The first motels were built in the early twenties, and with the rapid development of road transport, private and public, their numbers and popularity increased to the stage where some large hotel companies are now breaking into this market—almost in competition with themselves!

The authors have divided the book into four main chapters: an analysis of motel requirements; some examples showing a solution to a specific problem; the choice and the lay-out of a site, and the planning of rental suites. All are worth reading, though written for the operator rather than the architect. They are also well illustrated with photographs and diagrams of American motels which should well satisfy clients' and promoters' requirements, even if architecturally they are of no great merit. That the book deals only with motels in the U.S.A. is a pity, because Canada, Sweden, Spain and other countries have produced similar projects, which could have given valuable suggestions for solving given problems in widely different circumstances.

The motel idea has developed in the States for many reasons, of which at least two are applicable to conditions in this country as well. First, the motel can be, and largely is, built on cheap land outside the closely built-up areas and, secondly, its building costs will be substantially lower than those of a conventional hotel, by

virtue of its single or maximum double storey construction, less exacting fire precautions, easement in bye-laws, etc.

Since, with very few exceptions, it is virtually impossible to find the finance for new hotels in this country, it is very likely that some motel development will take place in the future and those interested in such schemes should find many worthwhile ideas in this book.

LOUIS ERDI [L]

English Medieval Castles, by R. Allen Brown. (The New Heritage series.) 8½ in. 208 pp. incl. pls. and pp. of illus. text illus. Batsford. 1954. 16s.

Books on British castles have been legion and one may wonder if there is room for another. From G. T. Clark's (1884), chiefly consisting of detailed surveys of examples, Alfred Harvey's (1911), the first with photographic views, and Hamilton Thompson's (1912), probably the most authoritative but with poor drawings, the sequence passes to Hugh Braun's (1936), by the same publisher as the work now under review, and Sidney Toy's *Castles of Great Britain* (1953), in many ways the best, with its site plans and dated plans, often at various stages, and its inclusion of other fortified structures. The present work at least keeps up the standard; half the chapters are chronological, as in preceding books, but half are from subject stand-points, including (like Braun) engines of war; it also includes fortified manor-houses, though the author avoids city walls, fortified bridges and churches, and fortifications generally. In spite of the title he includes Welsh examples. His approach is historical and scholarly, as shown (e.g.) in the note on the word 'keep', and draws upon recent archive research. The plans are good, many taken from the Royal Commission's volumes, and include air views; the jacket picture is one of the most entrancing colour photographs one has ever seen, and makes one regret that wrappers are not generally preserved.

There is a map showing distribution; and there is a good index, including illustrations, but distinguishing them (as is unfortunately usual of late) by their numbers, and not by their pages, which makes them hard to find.

H. V. M. R.

The Town and Country Planning Act 1954, by James Kekwick and Jack Hughes. Assisted by David Sullivan. (Royal Institution of Chartered Surveyors.) 8½ in. ix + 473 pp. 1955. (Cloth only.) £1 5s.

It is a commonplace that the Town and Country Planning Act 1954 vies with the various Rent Restriction Acts for pride of place in the hierarchy of unintelligible legislation.

The authors have borne this fact in mind in their treatment of the subject and gently take the reader through an Introduction, General Provisions, and Detailed Provisions before unleashing on him the full savagery of the annotated sections of the Act. The only justifiable criticism of such an approach is that it demands in the reader either a

retentive memory or an undue amount of back reference.

In the annotated text practical examples of the application of the Act are worked out, and indeed the whole book is planned to help the unfortunate individual who will have to apply these provisions in practice. In this the work achieves its object, with considerable assistance from a well-prepared index.

In order to keep the price reasonable some concession has had to be made, apparently in the presentation and appearance of the book. This, however, is probably no bad thing, since it will inevitably be subjected to constant hard usage.

D. R. P.

Modern Practical Brickwork, by William Frost and R. V. Boughton. 9½ in. xiv + 400 pp. + (iv) folding pls. text illus. Batsford. 1954. £2 10s.

There have been a number of books on brickwork since Jaggard's in 1929, but some of them have been elementary manuals and nothing so thorough as the present work seems to have appeared. In addition to the obvious subjects, special applications such as ornamental fireplaces, instructors' shop equipment, measurement, and by-laws (correctly spelt without the 'e', by the way!) are included. Recent introductions like reinforced brickwork and the 'Rhom-brick' bring the book up to date. There are photographs of actual buildings, colour reproductions (inevitably not all faithful) of types of bricks, and a good index.

H. V. M. R.

Correspondence

THE CLEANING OF TILES

The Editor, R.I.B.A. Journal.

SIR,—I have read with the greatest interest Dr. Howarth's excellent Report on Tiles, Faience, etc., in the August issue of the JOURNAL.

Dr. Howarth recommends the introduction of string courses to break the flow of water over large surfaces of glazed walling and so lessen the risk of water penetrating the joints. Unless glazed surfaces are kept clean their appearance is unfortunate and the greater the exposure to rain the cleaner they will remain. Dirt will lodge beneath horizontal strings and remain there until removed by washing.

In his subsequent article it is to be hoped that Dr. Howarth will have something to say about washing. The large surfaces of pallid tiles on many recent blocks of flats in London have dirtied quickly and to clean them must be a formidable matter. It strikes me that darker and richer colours, like the greens and browns favoured in the past for pubs, might show the dirt less.

Yours faithfully,

GEDDES HYSLOP [F]

Notes and Notices

NOTICES

Applications for the Fellowship. As announced in the R.I.B.A. JOURNAL for May 1955, p. 280, a new procedure for considering applications for election to the Fellowship will come into force on 1 January 1956. From that date all candidates without exception will be required to submit to the Fellowship Examiners drawings and photographs or examples of work. They may also be required to attend for an interview, which may however be dispensed with at the discretion of the Fellowship Examiners.

Hitherto, Associates who have been principals in private practice for not less than seven successive years, and certain other Associates regarded as being in a position of equivalent responsibility, have been able to proceed to the Fellowship without the submission of drawings or examples of work. This concession terminates on 31 December 1955.

After that date the Fellowship Examiners will meet monthly to consider applications for the Fellowship. Any Associates applying will be required to submit to the Examiners for the approval of the Council working drawings and photographs of one or more of their executed buildings, which may be supplemented by original sketches or measured drawings of actual work. Applicants are requested to indicate on their drawings the date upon which they were prepared. The provisions at present in force for Licentiate applying for election to the Fellowship are not affected.

New Building Materials and Preparations. The attention of members is drawn to the fact that information in the records of the Building Research Station, Garston, Watford, Herts, is freely available to any member of the architectural profession, and architects would be well advised, when considering the use of new materials and preparations of which they have had no previous experience, to apply to the Director for any information he can impart regarding their properties and application.

Members and Professional Affixes. The Council's attention has been called more than once to the practice among some members of adding a string of letters of doubtful value to the affix indicating membership of the Royal Institute on their letter paper.

This is a matter in which the Council obviously cannot dictate to members, and must trust to their good sense. It should be obvious, however, that the affix of a chartered body of high standing is weakened in effect by the addition to it of a string of other mysterious designations some of which probably indicate no more than the payment of an annual subscription.

COMPETITIONS

Manhattan Redevelopment: International Competition. The publishers of *U.S.A. Tomorrow* invite architects, city planners, engineers and all others identified with these or allied professions to submit schemes for the redevelopment of the mid-town area of Manhattan. *There is no undertaking that any award-winning entry will be used.*

Assessors: Mr. Charles Abrams, Professor Percival Goodman, Mr. Jose Luis Sert, Mr. William W. Wurster, Mr. Maurice E. H. Rotival.

Premiums: \$5,000, \$2,500, \$1,500, \$1,000.
Last day for submitting schemes: 1 June 1956.

Conditions may be obtained on application to: 'U.S.A. Tomorrow', Manhattan Redevelopment Competition, 210 Fifth Avenue, New York 10, N.Y., U.S.A.

New Offices, Enniskillen. The Fermanagh County Council invite British architects to submit designs for new offices to be erected in Enniskillen, Northern Ireland, on a site adjoining the Courthouse.

Assessor: Mr. R. S. Wilshire, M.C., F.R.I.C.S. [F].

Premiums: £500, £200.

Last day for submitting designs: 4 p.m. 20 December 1955.

Conditions may be obtained on application to the Secretary, Fermanagh County Council, Enniskillen, Co. Fermanagh.

Deposit: £2 2s. 0d.

A House for the Professional Man. Messrs. Tretol Ltd. invite architects to submit designs in competition for 'a house for the professional man'.

There is no undertaking that the house will be built.

Assessor: Mr. Clifford Culpin [F].

Premiums: £250, £150, £100.

Last day for submitting designs: 3 p.m. 8 November 1955.

No questions will be answered.

Conditions may be obtained on application to Messrs. Tretol Ltd., Tretol House, The Hyde, London, N.W.9. Deposit: £1 1s. 0d. (cheques to be made out to Tretol House Competition).

International Competition for a Monument in honour of Generalissimo Dr. Rafael Leonidas Trujillo Molina. Notice has been received from the Secretary General of the International Union of Architects of an architectural competition being promoted in the Republic of Dominica for the design of a monument commemorating Dr. Rafael Leonidas Trujillo Molina.

The conditions for this competition are at present not such as to conform to the Regulations for International Competitions in Architecture and Town Planning approved by the International Union, and members and Students R.I.B.A. are accordingly warned not to take part in this competition.

If, as a result of further negotiation, the conditions are amended to satisfy the requirements of the International Union, a further notice will be published.

BOARD OF ARCHITECTURAL EDUCATION

Special Final Examination. Minimum Age Limit.

Candidates who intend to apply for admission to the Special Final Examination are reminded that the Council have decided that the minimum age limit will be raised from 30 to 35 with effect from 1 January 1958.

ALLIED SOCIETIES

Change of Officers and Addresses

Coventry Society of Architects. Chairman, Savile Greenwood [A], 1 Queen's Road, Coventry. Hon. Secretary, G. R. Unwin [A], 1 Queen's Road, Coventry.

Hampshire and Isle of Wight Architectural Association, Isle of Wight Chapter. Mr. L. R. Smith [A], Chairman, has changed his address to Holyrood House, St. Thomas's Square, Newport, I.O.W.

Nottingham, Derby and Lincoln Society of Architects, Derbyshire Branch. Hon. Secretary, D. S. Davies [A].

South Wales Institute of Architects, Western Branch. Chairman, C. W. Mercer [L].

GENERAL NOTES

Evening Classes in Design. The Council of the Architectural Association are again offering facilities for evening classes in design to architectural students who have passed the R.I.B.A. Intermediate Examination, and who are not attending at any school of architecture. The classes are not intended as a preparation for the R.I.B.A. Final Examinations, but are to provide opportunities for discussion and criticism of students' work.

The course will be staffed on an honorary basis. No charge will be made for tuition, but students will be required to pay a termly registration fee of ten shillings and sixpence. Applications to the Principal's Administrative Assistant, School of Architecture, 34-36 Bedford Square, London, W.C.1.

R.I.B.A. Cricket Club. R.I.B.A. v. C.C.C. XI. 31 August. This resulted in a draw. Scores were as follows:

C.C.C. XI	
A. Brown (Beddington), b. Batty	91
P. V. Sherwood (Thames Ditton), c. Fyson, b. Mudie	107
T. Burton (Wimbledon Park), not out	47
R. Hill (Beckenham), c. Fyson, b. Mudie	3
A. Goodall (Kennedy & Donkin), not out	2
E. Taylor (Hook and Southborough), did not bat	
C. S. Davies (Alexandra Park), did not bat	
R. Forsyth (Wimbledon), did not bat	
D. Bennett (Fareham), did not bat	
B. Seabourne (Wimbledon), did not bat	
C. C. Davies (Wimbledon), did not bat	
Extras	3
	253

Mudie 2 for 49; Francis 0 for 65; Robinson 0 for 30; Norton 0 for 24; Batty 1 for 52; Smyth 0 for 33.

Fall of Wickets. 1 for 141 (Brown); 2 for 233 (Sherwood); 3 for 245 (Hill).

R.I.B.A.	
J. Kennedy Hawkes, b. Seabourne	21
J. G. Batty, b. Burton	5
B. S. Smyth, b. Burton	11
D. L. Robinson, b. Davies	52
J. R. G. Seward, not out	82
G. Fyson, c. and b. Goodall	2
C. A. R. Norton, b. Burton	6
L. G. W. Bishop, not out	4
R. D. Mudie, did not bat	
R. H. Holmes, did not bat	
H. E. S. Francis, did not bat	
Extras	22
	205

Seabourne 1 for 27; Burton 3 for 48; Hill 0 for 26; C. S. Davies 1 for 35; Goodall 1 for 22; Brown 0 for 22; C. C. Davies 0 for 4.

Fall of Wickets. 1 for 28 (Hawkes); 2 for 30 (Batty); 3 for 57 (Smyth); 4 for 134 (Robinson); 5 for 139 (Fyson); 6 for 148 (Norton).

Competition. Photographing Modern Architecture. Mr. C. H. Aslin, C.B.E., President R.I.B.A., has agreed to present the prizes to the winners of the photographic competition being conducted by ARCHITECTURAL DESIGN, and the ceremony will take place at the ARCHITECTURAL DESIGN stand at the Building Exhibition at Olympia at four o'clock on Friday 25 November.

The judges in this competition are Mr. Frank Yerbury, O.B.E. [*Hon. A.*], Miss Margaret Harker and Mr. Percy Harris, and the prizes are £25, £10, and £5. Closing date for entries is 20 October. Further particulars may be obtained from ARCHITECTURAL DESIGN.

Obituaries

Alexander Nisbet Malcolm [*F*], former Council Member, Vice-President of the Royal Incorporation of Architects in Scotland and one of the first County Architects in Scotland, died on 11 April, aged 76.

As a County Architect Mr. Malcolm was of course responsible for a wide range of buildings, but best known are his schools—the Technical School, Falkirk; Dawson Park Special School, Falkirk; St. Modan's Roman Catholic Secondary School, Stirling; Riverside School, Stirling; and the Central (Secondary) School, Larbert; also the Infectious Diseases Hospital at Bannockburn.

Mr. Gordon B. Biggar [*F*] writes of Mr. Malcolm as follows:

'The recent death of Alexander Nisbet Malcolm at Stirling is a considerable loss to the profession in Scotland. He was one of the rare members of the profession who had a wide and early knowledge of both sides of it, namely private practice and official work.

'A native of Polmont, trained in Glasgow, after qualifying and some travelling abroad he set up practice in Grangemouth. After a break through service in the Royal Engineers during the First World War he practised in Falkirk until 1921. In this year he received an official appointment as architect to the old Stirlingshire Education Authority, becoming a pioneer in a new field. This appointment developed into promotion as County Architect in 1932, after his qualities had proved that this new field had a future and a value. In this sphere he was responsible for many varied works ranging from schools to hospitals.

'He retired in 1943 from this post but retained his connection with the profession. He was an original member of the Glasgow Institute of Architects and through a personal loyalty remained with this chapter although his wise guidance was at all times available to the young Allied Society formed in Stirling in 1933. He served on the Council of the Royal Incorporation of Architects in Scotland and eventually became its Vice-President as well as President of the Glasgow Chapter in 1945-46. He also served as a Council member of the R.I.B.A.

'One post which he filled inconspicuously but with great effect was as Convenor of the Quarterly Sub-Committee of the R.I.A.S., and through a period of years he advanced matters and ensured that this publication was kept in being.

'He will be missed particularly among the younger members of the profession for whom he always had a kindly word and ready help. His quiet nature and friendly presence made him an easily approachable man to any young man in need of advice and help.

Mr. Archibald T. Caldwell [*L*], Architect to the County Council of the Stewartry of Kirkcudbright, adds the following tribute: 'To those

of us who were fortunate enough to receive our early training in the private office of Mr. Malcolm and were later on his staff, A. N. M. was not only the "boss," he was friend and adviser too, and up to the end his personal interest in his "old boys" never dwindled.'

John Edward Dixon-Spain, O.B.E. [*F*] died on 7 May, aged 77.

Mr. Dixon-Spain practised throughout his career in London—in Hanover Square. In 1905 he entered into partnership with Mr. Charles Nicholas [*F*] and they were joined in 1946 by Mr. Lawrence Crampton [*L*] and in 1947 by Mr. Frank Woolhouse [*L*].

Mr. Dixon-Spain's best known works are the Quasr el Aini State Hospital, Cairo, Newcastle Public Hall and Baths, the Rock Hotel, Gibraltar, and the Church of St. Joan of Arc at Farnham. He was also responsible for a number of film studios and for the New Gallery Cinema, London, but after his conversion to Roman Catholicism in about 1945 (he was the son of an Anglican vicar) he concentrated chiefly on designing primary and secondary Catholic schools.

Mr. Dixon-Spain was a past member of the Science Standing Committee.

Mr. Kenneth M. B. Cross, Vice-President R.I.B.A., writes: 'It was after the competition for the Central Public Hall and Baths at Newcastle upon Tyne in the 1920's that I first met D.-S. Although the Newcastle building was impressive, it was Dixon-Spain's winning design for the Quasr el Aini State Hospital at Cairo, illustrated by splendid drawings, which I particularly admired. The hospital and State Medical School were subsequently carried out by Dixon-Spain. He did other hospitals, business premises, schools and churches as well as domestic work and his design was always fundamentally sound and expressive of the character and good taste of the author.

'Dixon-Spain was a first-class draughtsman at a time when great value was attached to line drawings. He was a great worker, devoted to architecture, and his standards both for himself and for others were very high. With his passing the profession has lost an architect of great ability and unerring judgement. He was a man of complete integrity whose quiet manner masked a very strong character which was illuminated by a slightly sardonic wit.

'Dixon-Spain always shunned the limelight but he was mentioned in dispatches and awarded the O.B.E. after active service in France and the Middle East and during his last illness he was made a Chevalier of the Legion of Honour in recognition of his services to France while working for the Fine Arts Commission.'

Shirley Lanphier Blackburne [*F*], of Nairobi, died on 10 June, aged 58.

Mr. G. B. E. Norburn [*F*], of Blackburne, Norburn & Partners, Nairobi, has sent us the following appreciation prepared by a number of the senior architects in Nairobi:

'By the death of Shirley Blackburne at the age of 58 Kenya has lost one of its foremost architects. He was born in New Zealand in the year 1897 and received his training at the Architectural Association School in London shortly after the first world war, being elected Associate R.I.B.A. in 1924. He came to Kenya in 1927 as a member of the "loan" staff of the P.W.D. at a time when, with Sir Edward Grigg (as he then was) as Governor, the Colony's architectural development can be said to have been launched.

'It soon became clear that his ability was above the average. He met with early success in public competitions, being joint author with

Mr. C. Rand-Overy [*F*] of the winning design for the Nairobi Municipal Market and following this up by being placed second in the Town Hall Competition in 1932.

'In that year he began practice on his own account, an act of courage in the midst of the depression. In due course he was responsible for the design of scores of interesting houses and many buildings of character, diverse practice in East Africa giving him ample opportunities of self-expression. His design work was marked by a freshness that kept him well to the fore as a contemporary designer. His most recent building, that of Lewis & Hodgkiss Ltd. in Sadler Street, is a good example of his skill. His forthrightness and integrity, allied to a careful attention to detail, gave confidence to both clients and contractors.

'He was elected Fellow R.I.B.A. in 1933. He was a Member of the Council of the East Africa Institute of Architects for some twenty years, having served as Hon. Secretary and Treasurer, Librarian, Vice-President and President. His fellow members of the Council greatly valued his opinions and sound judgement.

'Apart from his professional attainments, he had a number of other interests. Although physically handicapped, he was a man of great courage: a keen motorist, he had won cups for car trials and hill climbs, to which he added trophies for flying in later years. He first obtained his pilot's licence when well over the age of 50, since when he flew many hundreds of hours to all parts of East Africa.

'He was a most cheerful companion and genial host with a ready welcome for everyone. He will be greatly missed by his many friends.'

J. S. Wilson [*Hon. A.*], died on 20 May.

Mr. W. H. Ansell, Past President R.I.B.A., has supplied the following appreciation:

'J. S. Wilson was a highly skilled engineer who had an unusually keen appreciation of architectural values and of the importance of their preservation. For ten years from 1897 onwards he assisted Sir Benjamin Baker, and following Baker's death in 1907 Wilson became a partner in the firm with Mr. A. C. Hurtzig.

'In 1905 Sir Benjamin asked Wilson to investigate the cause of the failure of part of the roof of Charing Cross Station which had collapsed, but it was his work in the Waterloo Bridge controversy which brought his name prominently before architects and finally won him the distinction of the Honorary Association of the R.I.B.A. The echoes of that controversy have died down and Sir Giles Scott's beautiful bridge has taken the place of Rennie's. Had wiser counsels prevailed, however, London might today have had both bridges.

'It was in 1923 that one of the piers of the old bridge clearly showed that serious subsidence was taking place. The issue was joined. The official reports advocated the demolition of the pier and eventually the whole bridge, while many independent experienced civil engineers, including Sir Harley Dalrymple-Hay, insisted that the pier could safely be underpinned and the bridge saved. Mr. Arthur Keen, then Honorary Secretary of the Institute, presided over a conference of Societies interested in the preservation of the bridge. A conference of engineers was also formed under the chairmanship of Sir Wilfred Stokes of which Wilson became the Honorary Secretary. In 1926 this conference produced a report showing that it was clearly possible to underpin the bridge, but the controlling power was determined to demolish it and all the efforts to save it came to naught.

'Bridges, particularly arched bridges of brick or stone, were Wilson's especial delight. For the Society for the Protection of Ancient Buildings

he visited and reported upon many of the old river and canal bridges in the country in his honorary capacity as consulting engineer to the Society.

'Wilson was a hospitable and delightful host at his home in Old Bosham, the beauty of which he greatly appreciated and spared no effort to preserve. His tall handsome figure capped by a shock of flowing white hair was well known in the village. He had many friends among writers and artists, among whom was D. S. McColl, and his memory will long be retained.'

Frank Quentery Farmer [Retd. F] died on 18 February, aged 76.

Mr. Farmer, after a period in private practice first in Liverpool from 1904 onwards and later in Coventry, spent the years of the First World War in government service in connection with propellants. After the war he joined the firm of North, Robin and Wilsdon, leaving them in 1934 to start in partnership with Mr. Frankland Dark [F]. The firm have been responsible for a large number of power stations throughout the country, as well as for schools, factories and research laboratories for the English Electric Co. Ltd. and the Central Electricity Authority.

Lieut.-Colonel Edgar Hinton Fawcner, T.D., D.L. [F], twice President of the South Wales Institute of Architects, died on 28 June, aged 87.

Colonel Fawcner was the son of the late Mr. J. Follett Fawcner, one of the founders of the practice of Messrs. Habershon, Fawcner and Co. of Newport, with whom he served his articles. He became a partner in 1910 and at his death was the only remaining principal.

His architectural works included churches and chapels in Monmouthshire, drill halls for the Monmouthshire Territorial Army Association, shops, offices in Newport and Monmouthshire and a number of houses throughout South Wales. He was for many years architect to the Monmouthshire Territorial and Auxiliary Forces Association.

Colonel Fawcner was a keen soldier and was commissioned in the Fourth Volunteer Battalion, South Wales Borderers, in 1897 and promoted Captain in 1900. In 1908 when the Territorial Army came into being his Battalion ceased to exist and he was posted to the Third Battalion Monmouthshire Regiment and promoted Major. He transferred to the R.E. in 1915, and became Lieutenant-Colonel in 1916 and C.R.E. in 1918. He was awarded the Officers' Territorial Decoration in 1917, was twice mentioned in despatches in 1918 and 1919 and was appointed Deputy Lieutenant of Monmouthshire in 1947.

Colonel Fawcner was one of the original founders of the South Wales Institute of Architects and was its President in 1907-8 and again in 1933-35. He was also one of the founders of the Eastern (Newport) Branch of the Institute and was its Chairman 1926-29.

Ernest Tellwright Watkin [F], past President North Staffordshire Architectural Association, died on 13 July, aged 79.

Born at Park Lodge, Stone, Ernest Watkin lived as a boy in Cobridge and was intimate with the Bennett family circle. He attended the old Burslem Endowed School and Cobridge Collegiate and the old Burslem School of Arts and Sciences (Wedgwood Institute). He was articled to Elijah Jones [F] of Hanley about 1895, later became his chief assistant and subsequently set up in his own practice in Burslem. Shortly afterwards he became architect to the Burslem and District Co-operative Society, in which capacity he continued throughout his long professional life, carrying out a large amount of work for them. He was

also appointed architect to the North Staffordshire Cripples Hospital, Hartshill, and to the Staffordshire Cripples Hospital, Biddulph.

Mr. Watkin worked with various partners at different times, the most recent being Mr. R. J. Willis, M.A. [A], who joined him in 1945, and Mr. George Cooper [A] who joined him in 1948. They now carry on the practice under its current title of Watkin, Willis and Cooper.

From Mr. Watkin's extensive practice the following buildings may be picked out for special mention: four emporia, 70 to 80 branch premises, a bakery, an abattoir, guild rooms and cafés for the Burslem and District Co-operative Society; much licensed premises work over a wide area; pottery factory extensions and major alterations, including tile works and refractory works; the old Port Vale football ground and stands, housing schemes at Stone and two large dairies and distribution centres for the North Staffordshire Co-operative Dairies. He dealt also with valuations for collieries, subsidence claims, mining subsidence repairs and fire claims.

Mr. Watkin was a founder member of the North Staffordshire Architectural Association and served as its President for two years, during which period he took great interest in all student activities. Many generations of students too have been trained in his office. To quote from his partners, writing in the Burslem newspaper THE EVENING SENTINEL, 'nothing pleased him more than to recognise ability and industry; and in the many buildings he supervised his attention to detail was acute and he was satisfied with nothing less than honest craftsmanship and sound materials. His life work brought him from traditional building methods at the beginning of the century to the complicated techniques and new materials of the present time. . . . A link with 19th century Burslem is broken.'

Apart from his profession, Mr. Watkin's interests lay in sport and in Freemasonry. He was an early motorist and a keen cricketer and golfer. He was Past Master of St. Martin's Lodge No. 98, with past Provincial (Staffordshire) rank, a Past Master of the Gough Mark Lodge, a member of the Ark Mariners Lodge, a joining member of John of Gaunt Lodge and a founder of Castellum Lodge.

William Harold Jones [F] died on 17 November 1954, aged 67.

Mr. Jones studied at the Royal Academy School of Architecture and was then articled to Mr. W. Lacy-Ridge [F] of High Holborn, Diocesan Surveyor to Chichester. He was for a time with Messrs. Weir, Burroughs and Weir and in 1932 started his own practice. He specialised in ecclesiastical architecture and was responsible for the rebuilding of Church House, Barnet, and for the restoration and rebuilding of various churches for the London Diocesan Fund.

James Wood, M.C. [A] died on 18 June 1954, aged 66.

Mr. Wood, after studying at the College of Art, Edinburgh, went to Oban High School as art master. He volunteered for service in the First World War, joining the 23rd Manchester Regiment. He was awarded the M.C. and was twice mentioned in despatches, and attained the rank of Major.

Returning, he continued for a time as art master for Banffshire Education Authority. In 1920 he became an Associate of the R.I.B.A. and in 1929 was appointed County Architect to Banffshire. He was responsible for the design of primary and secondary schools, hospitals and nurses' quarters, surveys of Burghs and of the county for town planning

purposes, and also for the new Academy, Nairn.

In the Second World War Mr. Wood served in the Home Guard, being second in command of the Banffshire Battalion. On retirement from his official post in 1950 he carried out some private practice work in Cullen, Banffshire.

Hubert Savage [A] died on 28 April in Victoria, British Columbia, where his entire career had been spent, although he served his articles in London. He was 71 years of age.

Mr. Savage began private practice in 1914 and built chiefly private houses and schools, also the Queen Alexandra Solarium.

Francis William Marshall [A] died on 24 May, aged 67.

Mr. Marshall was employed in the Premises Department of Lloyds Bank Ltd. from 1921 to 1928, and then was appointed architect to the Bank of London and South America, holding this post until 1948.

Mr. Marshall was elected Associate in 1923. Among Mr. Marshall's interests was cricket, and he occasionally played for Warwickshire between the wars.

Members' Column

This column is reserved for notices of changes of address, practices and partnerships vacant or wanted, practices for sale or wanted, office accommodation, and personal notices other than of posts wanted as salaried assistants for which the Institute's employment register is maintained.

APPOINTMENTS

Mr. D. W. K. Dawson [A] has been appointed Director of Rural Housing, Accra, and his address is now Department of Rural Housing, Private Post Bag, Accra. He will be pleased to receive trade catalogues, etc.

Miss Elaine C. Denby [A] has resigned her appointment with the Westminster City Council and has begun private practice at 20F, Queens Gate Place, S.W.7. (WESTern 9510) where she will be pleased to receive trade catalogues, etc.

Mr. R. Iredale [A] has taken up an appointment as Principal Assistant Architect to the Nottinghamshire County Council. His address is County Architect's Department, County Hall, Trent Bridge, Nottingham.

Mr. Leonard Howarth, A.M.T.P.I. [A], was appointed Burgh Architect and Town Planning Officer, Dunfermline, Scotland, in April last.

Mr. John S. Rank [A] has been appointed Borough Architect, Stockport, Cheshire, and takes up his appointment on 26 September.

PRACTICES AND PARTNERSHIPS

Mr. G. Stuart Alderson, A.M.T.P.I. [A], has resigned his appointment as Architect and Planning Officer to the Portadown Borough Council and has joined the practice of A. C. Leith, Bartlett and Partners, Architects and Engineers, 458 St. Kilda Road, Melbourne, S.C.2, Victoria, Australia.

Messrs. J. R. Bhalla [A], **D. P. Sharma, A.M.T.P.I.** [A], and **J. C. Puri, A.M.T.P.I.** [A], have entered into partnership and set up practice at G-67 Connaught Circus, New Delhi. The style of the firm is **Bhalla Sharma and Puri**. They will be pleased to receive trade catalogues, etc.

Mr. J. W. M. Dudding [F] has taken into partnership his associates **Mr. John Middleton** [A]

and Mr. A. B. Grove, Dipl. T.P., A.M.T.P.I. The practice will continue as before under the title of **John Dudding and Partners** at 30 Clarendon Street, Nottingham (Tel. nos. 44196 and 46979). A branch office will shortly be opened at Chesterfield, Derbyshire.

Mr. Kenneth W. Favell [A] is now in private practice at 23 Well Street, Ruthin (Ruthin 2016), under the name of Kenneth W. Favell, having moved from the Old Cloisters, Ruthin. He is also operating an office at 6 Temple Row, Wrexham (Wrexham 4192) in association with Lieut.-Col. T. C. Hughes, M.M.

Mr. D. Foster-Smith [A] has taken into partnership **Mr. G. J. Wallis** [A]. The firm, formerly known as Morris Thompson and Foster-Smith, will now be known as **Foster-Smith and Wallis**. It will continue at its old address at 12 St. George Gate, Doncaster (Tel. 2018).

Miss Janet B. Gnosspelius [A] has opened an office in Church Street, Ambleside, Westmorland, where she will be pleased to receive trade catalogues.

The name of the former firm of H. S. Goodhart-Rendel and Partners has been changed to **Goodhart-Rendel, Broadbent and Curtis**.

Owing to ill-health, **Mr. Sydney Gregson** [F] has resigned his appointment as County Architect of Cornwall and from 1 November will be starting in private practice at Keighley, Tregollo Road, Truro, where he will be pleased to receive trade catalogues, etc.

Mr. Howard V. Lobb announces that **Mr. John Ratcliffe**, O.B.E., A.M.T.P.I. [F], has joined him in practice. The name of the firm will remain **Howard V. Lobb and Partners**.

Mr. H. W. Pickstone, A.M.T.P.I. [A], has relinquished his position as Architect/Planner 1 with the Vancouver City Planning Department and entered into partnership with Messrs. Clack and Clayton. The title of the firm will now be **Clack, Clayton, Pickstone, Architects and Town Planning Consultants**, and their address is 605 Courteney Street, Victoria, B.C., Canada.

Mr. B. N. Rahalkar [A] is now in practice with Urban Planning Associates, Fair Lawn, New Jersey, U.S.A.

Mr. D. P. Reay [A] is now practising in the San Francisco Bay area in association with **Mr. Vernon De Mars**, A.I.A. His address is **De Mars and Reay Associated**, 2161 Shattuck Avenue, Berkeley, California, U.S.A.

Mr. David C. Scott [A] has begun practice at Straquan, Fountain Road, Golspie, Sutherland, where he will be pleased to receive trade catalogues, etc.

Mr. Gerald F. Sheard [A] has begun practice at 14 Fitzroy Street, London, W.1, and will be pleased to receive trade catalogues, etc.

Messrs. S. T. Walker (S. T. Walker [F] and M. Foreman [A]) of 83 Suffolk Street, Birmingham 1 (Midland 3682-3) have taken into partnership **Mr. G. Winteringham** [A] and will practise as **S. T. Walker and Partners**. **Mr. Winteringham** has closed his office at 15 Newhall Street, Birmingham 3.

Mr. M. V. H. Watkins [A] has recently begun practice at 28 Walter Road, Swansea, South Wales (Swansea 57931). Trade catalogues, etc., will be welcomed.

CHANGES OF ADDRESS

Mr. H. Benson Ansell [A] has been appointed Deputy Borough Architect, Bournemouth, and his address is the Town Hall (Bournemouth 2770, Ext. 158). His private address is 1a War-

ren Edge Road, Southbourne, Bournemouth, Hants. (Southbourne 45105).

Mr. F. A. Czop [A] has changed his address to 203 South 15th Street, Philadelphia 2, Pennsylvania, U.S.A.

Mr. B. R. Davis [A] has moved to 94 Church Road, Stretton, near Burton upon Trent.

Mr. and Mrs. J. R. Hather [AA] (Mrs. Audrey Elizabeth Hather) have left Corby and their new address is P.O. Box 1911, Kampala, Uganda, East Africa.

Mr. M. J. Hislop [A] has moved to Flat 7, 10 Walmley Place, Walmley, Sutton Coldfield.

Mr. W. A. Larché Hopkins [A] has left the service of the Surrey County Council and has taken up an appointment with the Southend-on-Sea Borough Council. His home address is 16 Marcus Avenue, Thorpe Bay, Essex, where he will be pleased to receive catalogues concerning components, materials, etc., for schools and housing.

Dr. Thomas Howarth [A] is visiting American schools of architecture and his forwarding address is c/o Dr. J. C. Howarth, Professional Buildings Suite 9A, 320 North Main Street, Orlando, Florida, U.S.A.

Mr. Eric W. Hoyte [A], who has obtained his Master's Degree in Landscape Architecture, is now at 48 Irving Street, Cambridge, Mass., U.S.A.

Mr. V. A. St. Aubyn Hubbard [A] is now at Windrift, Old Bosham, Sussex (Bosham 3325).

Mr. Ward Koss [A] has changed his private address to 20 Norley Vale, London, S.W.15.

Messrs. Michael Laird and Will Redpath [AA] have moved their offices to 11 Randolph Place, Edinburgh 3 (Edinburgh 33969).

Peter and Janet Locke [AA] have changed their address to 59 Lee Park, Blackheath, London, S.E.3.

Mr. J. F. McLean [A] has returned to the United Kingdom from Accra and his address is 3 Waverley Road, Rustington, Sussex.

Mr. H. Werner Rosenthal [A] has moved his practice to London. His office is now at 34 Hannay Street, Oxford Street, W.1. (Lanham 5774). New catalogues, etc., will be welcomed.

Messrs. W. H. Saunders and Son [L/A/F] have transferred their Gosport office to 133 High Street (Gosport 88071). Their Coventry offices have been moved to 23 Eaton Road, Coventry (Coventry 64359 as before).

Mr. James Seeley [A] has opened a new office at 1 Potter Street, Sandwich, Kent. He continues to practise also from 1 Marlins Park Avenue, Chislehurst, Kent.

Messrs. Bernard Taylor and Associates [AAA] of The Market Place, Macclesfield, have opened a Manchester office at 16 Kennedy Street where they will be pleased to receive trade catalogues, etc.

PRACTICES AND PARTNERSHIPS WANTED AND AVAILABLE

Associate (38), in responsible position, requires partnership in established practice, preferably Newcastle upon Tyne area. Experienced both private practice and local authority. Some capital available. Box 69, c/o Secretary, R.I.B.A.

Associate, Dip. Arch., A.M.T.P.I., 18 years' experience in private practice, at present a salaried partner, seeks partnership or appoint-

ment leading thereto in Cardiff. Capital available. Box 70, c/o Secretary, R.I.B.A.

Associate (31), Dip.Arch., with 4½ years' comprehensive post-qualifying experience at home and overseas, seeks partnership or position leading thereto, preferably in Scotland, south or south-west England. Some capital available if required. Box 71, c/o Secretary, R.I.B.A.

Associate running a small contemporary Mayfair office, celebrating its second anniversary, having too much work for one and not enough for two, would consider joining hands with another in similar position. Box 72, c/o Secretary, R.I.B.A.

Associate, A.M.T.P.I. (38), seeks partnership or position leading thereto, with contemporary architect. Southampton-Portsmouth-Chichester region preferred. Twelve years' varied work including domestic, educational, industrial and town planning. Small amount of capital available. Box 73, c/o Secretary, R.I.B.A.

Associate (35), 19 years' experience in all types of work, seeks partnership in west or south-west of England. Capital available. Box 74, c/o Secretary, R.I.B.A.

Required to purchase, architectural practice within 50 miles of Bath, London or Norwich. Box 76, c/o Secretary, R.I.B.A.

Associate, Dip.Arch. (Sheffield), aged 34, with experience of contemporary and traditional work, requires partnership. Capital available. Box 77, c/o Secretary, R.I.B.A.

Established firm with greatly increasing practice in pleasant West Midlands district seeks qualified architect of experience, including banks and hospitals, with view to partnership. Box 78, c/o Secretary, R.I.B.A.

Associate, 34, desires working partnership or position leading thereto. Willing to specialise. Some capital available. Box 79, c/o Secretary, R.I.B.A.

WANTED

Dumpy level and surveying equipment. Please state price required. Box 75, c/o Secretary, R.I.B.A.

The Royal Institute of British Architects, as a body, is not responsible for statements made or opinions expressed in the JOURNAL.



£2108

for you at age 65

or

Pension

of £195 instead of lump sum

Family Protection

Capital sums plus bonuses

and

a tax-free income

to your wife and family in the event of your death before 65

The Cost

£3 13s. 2d. per month
(less than 2s. 6d. per day)

These benefits are based on age 30 next birthday and assume continued rate of bonus

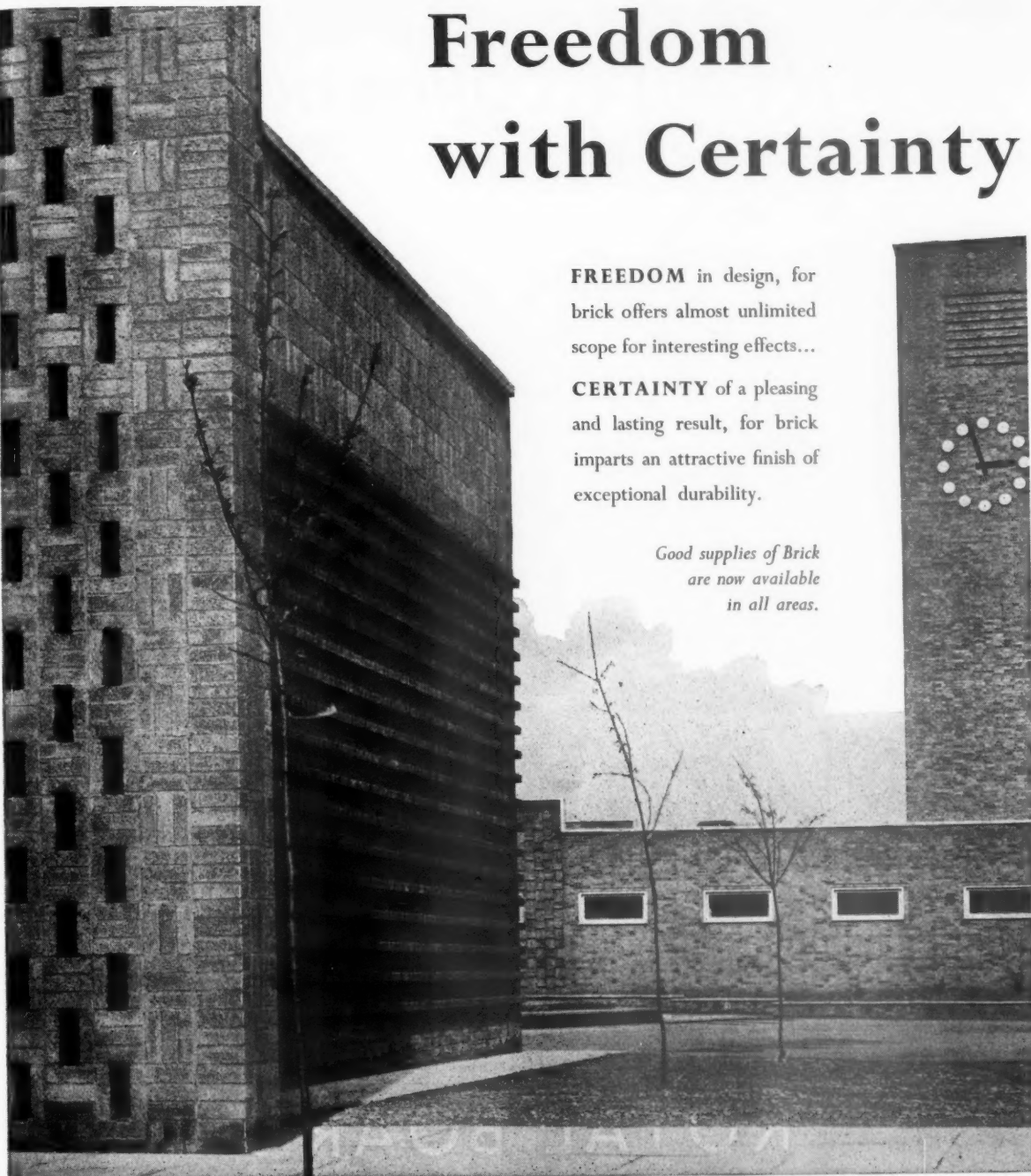
Particulars from: The Secretary, A.B.S. Insurance Agency, Ltd., 66, Portland Place, London, W.1. (Tel. LANgham 5721)

Freedom with Certainty

FREEDOM in design, for
brick offers almost unlimited
scope for interesting effects...

CERTAINTY of a pleasing
and lasting result, for brick
imparts an attractive finish of
exceptional durability.

*Good supplies of Brick
are now available
in all areas.*

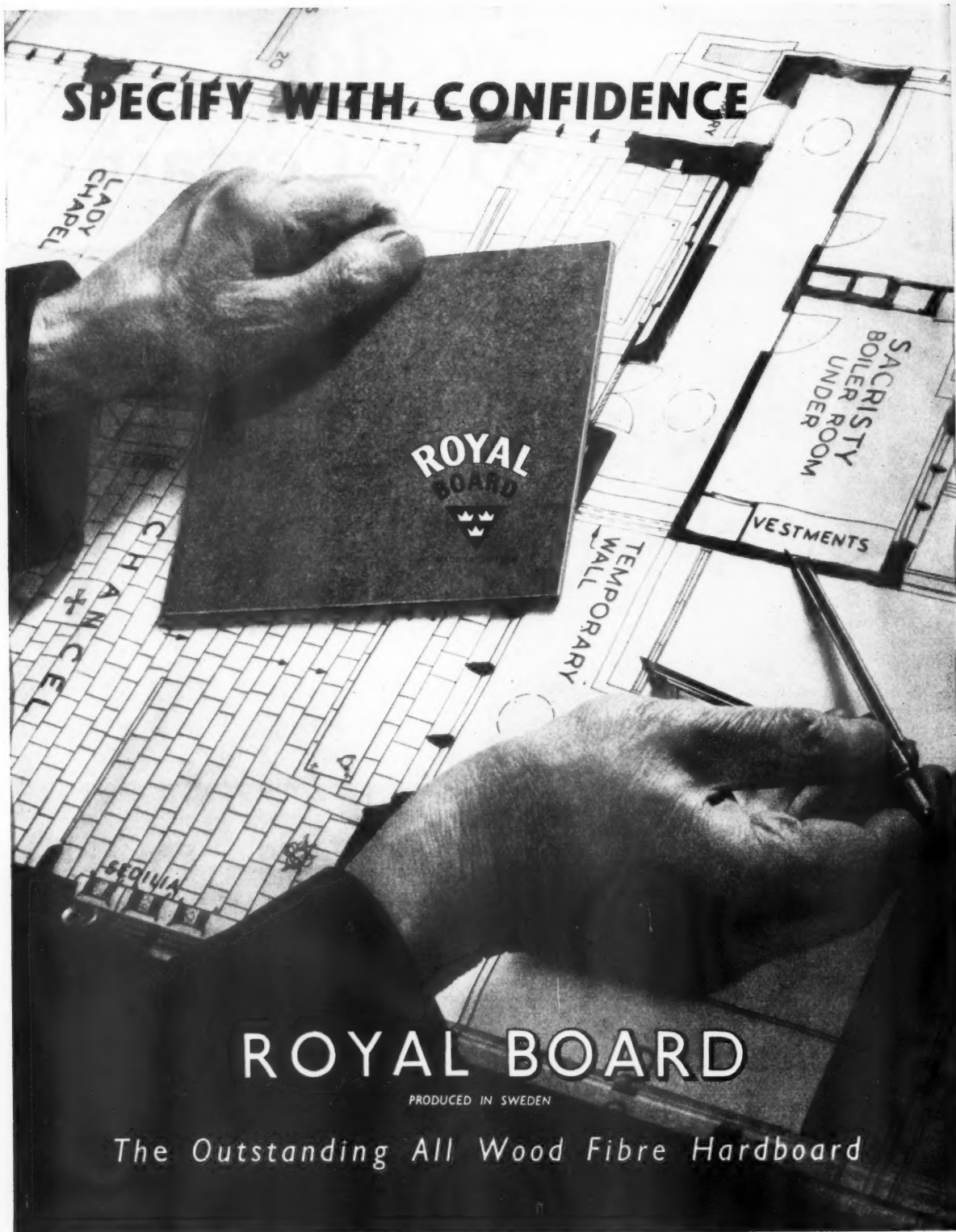


Hassenbrook Secondary School, Stanford-le-Hope, Essex. Designed by Gerald Lacoste, M.B.E., F.R.I.B.A., in association with Harold Conolly, F.R.I.B.A., County Architect
Assistant Architects: Kenneth Dod, and Campbell Ross, A.R.I.B.A.

BRICK *for Modern Building*

Issued by The National Federation of Clay Industries, Drayton House, London, W.C.1.

SPECIFY WITH CONFIDENCE

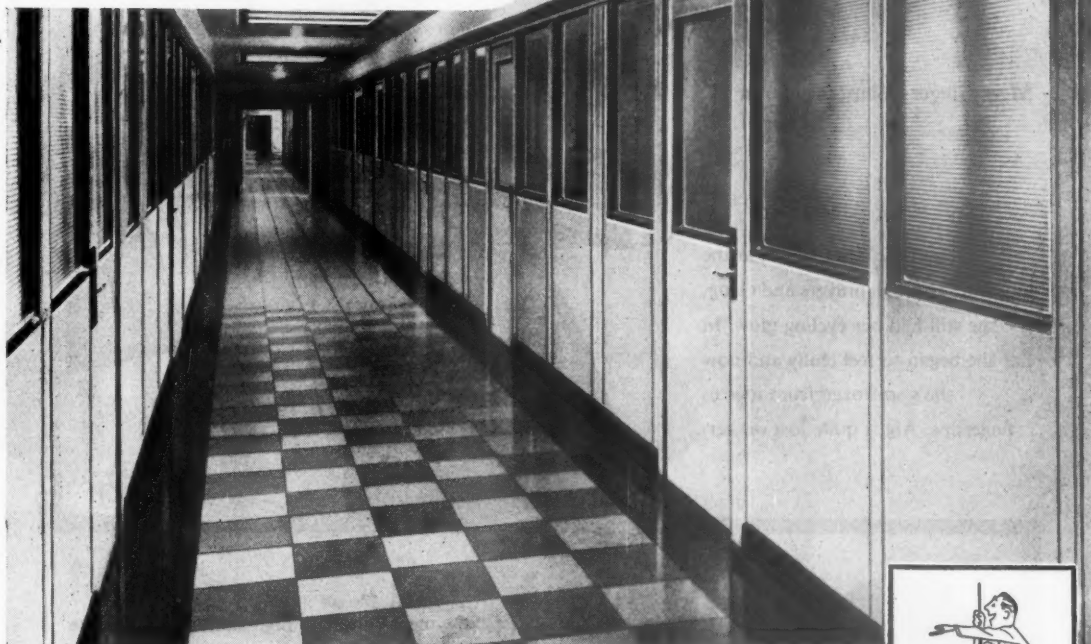


ROYAL BOARD

PRODUCED IN SWEDEN

The Outstanding All Wood Fibre Hardboard

When planning . . .



specify
Steel Partitions and Movable Walls

- Fully-Flush, Semi-Flush and Factory types available.
- Standard component assembly permits alterations and additions at minimum cost.
- Available in five standard colours. Attractive in appearance—rigid, durable, fire-resisting.
- The Planning Division can assist with layout problems, and our experienced fitters install the Partitions.
- In dealing with Sankey-Sheldon you buy direct from the manufacturers. Offices and showrooms throughout Great Britain carry stocks ensuring prompt delivery and local service.
- Send for Catalogue P154/BAS.



**The people
to see are
SANKEY-
SHELDON,
of course!**

Sankey-Sheldon

SANKEY-SHELDON LIMITED, 46 CANNON STREET, LONDON, E.C.4

Telegrams: SANKESHEL, CANNON, LONDON.

Telephone: CITY 4477 (12 lines).

DESKS . FILING CABINETS . CUPBOARDS
WARDROBES . CLOTHES LOCKERS . STEEL SHELVING . STORAGE BINS . LIBRARY SHELVING

Meet Ginger Johnstone, Form 2a.

Though she's not so hot at the moment. Through prayers and Geog, she still had her cycling glow. In Lat she began to feel chilly and now she's so frozen from toes to fingertips, Alg is quite lost on her.



Now meet Ginger in high summer; but please don't shake her. She dreamed through Geom, drowsed through Arith and now she's gone right off in Eng. The person who *ought* to be shaken by this state of affairs is the architect who designed the school without Fibreglass insulation.

Yet even now, applied to the roof alone, this inexpensive, everlasting, highly-efficient insulation would make all the difference to Ginger's warmth and well-being in winter, coolness and concentration in summer.

WRAP that school in

FIBREGLASS

TRADE MARK

FIBREGLASS LIMITED, RAVENHEAD, ST. HELENS, LANCs. (ST. HELENS 4224)

FACTORIES AT ST. HELENS, LANCs. AND POSSILPARK, GLASGOW.



This recessed lighting scheme of the canteen in the American Embassy was designed by Philips

For Imaginative Lighting

Talk to **PHILIPS**

Philips will be happy to design for you — there is no charge

Some of the more imaginative lighting schemes of recent years have been the result of close co-operation between architects, electrical contractors, and the Philips Lighting Design Service.

The advice and assistance provided by this Philips Service is entirely free, and experienced lighting engineers in each Philips branch area are at your service. In addition, a fully qualified architect with special experience of lighting in its relation to architecture and colour is available to co-operate with you.



PHILIPS ELECTRICAL LTD

LIGHTING DIVISION • CENTURY HOUSE • SHAFTESBURY AVENUE • LONDON • W.C.2

Tungsten, fluorescent, blended and discharge lamps & lighting equipment • Radio & Television Receivers • "Photoflux" flashbulbs, etc.

FOR CONCRETE REINFORCEMENT



Architects : Norman & Dawbarn. Contractors : St. Pancras Borough Council, Building Department.

The photograph shows a nine-storey block of residential flats in course of erection for the St. Pancras Borough Council. The reinforced concrete frame was carried out in our patent FRAMEWELD system.

FRAMEWELD

TRADE MARK

PATENT No. 589066

A real time and money saver

A copy of the FRAMEWELD handbook describing the system will be sent on request.

T. C. JONES

**AND COMPANY LTD
REINFORCEMENT ENGINEERS**

Wood Lane, London, W.12 • Tel : SHEpherd's Bush 2020

Bute Street, Cardiff • Tel : Cardiff 28786



Treorchy, Glamorgan • Tel : Pentre 2381

copying

To claim that copying costs come down with AZOFLEX is a bold statement — but one that happens to be very true. AZOFLEX photo-printing machines and materials provide the ideal means of producing inexpensive, high-quality facsimiles of drawn, typed or printed originals of all kinds — single or double-sided, translucent or opaque. Many important industrial, commercial and professional organizations have already proved the economy and effectiveness of the AZOFLEX process.

costs

The simplicity and cheapness of AZOFLEX are quite startling. With the Model 42/63 Mark II Combine Printing and Developing Machine illustrated here, for example, one *unskilled* operator need only feed originals and copying material into the machine in order to produce a steady output of finished prints, dried, flat and ready for trimming and collating. Exposing, developing and print delivery are completely synchronized.

come

With the AZOFLEX method, money is saved because not only does it eliminate the need for specialist operators, but neither darkroom accommodation nor water and drainage services are required, and the materials themselves are inexpensive. AZOFLEX also cuts costs by speeding up output and by giving copies of greatly improved quality even from poor originals.

down

There is a comprehensive range of AZOFLEX printing and developing machines and a wide variety of AZOFLEX photo-printing materials designed to meet the needs of every type of organization. AZOFLEX creates no mess or unpleasant smell, while the materials are very easy to handle and process.

with

Backed by all the photographic experience and skill of Ilford Limited, AZOFLEX materials are produced in the world's most up-to-date diazo coating plant and are remarkable for their long shelf life, intense line and resistance to fading.

For descriptive literature about AZOFLEX machines and materials, please apply to Ilford Limited, Azoflex Department AZ37, 104 High Holborn, London, W.C.1 (Telephone: HOLborn 3401). Demonstrations of the Azoflex process can be seen at this address and also, by appointment, at Ilford Limited, 22 Lloyd Street, Manchester 2 (Telephone: Deansgate 4233) and in other principal cities.



ILFORD

Azoflex

PHOTO · PRINTING MACHINES AND MATERIALS

White heat and willing hands...



CLOSE-UP OF CASTING. A glowing crucible of molten metal meets its mould. This is the critical moment at which the skill of the craftsman is committed for all time.

In the safe hands of the Maple-Martyn Organisation, this stage of the job—like all those which have preceded it—will be as perfect as keen and accomplished men can make it.

THE CAST. The real skill in the production of each distinctive piece of work by Maple-Martyn lies in the cast itself. Illustrated here the craftsman is putting the delicate finishing touches to the cast for another important contract.

FOUNDRY SHOT. This panoramic view of the foundry gives some conception of the facilities which help to keep Maple-Martyn in the van as suppliers of all types of architectural metalwork.

THE

MAPLE

MARTYN

ORGANISATION

FURNISHING & DECORATION • CONSTRUCTIONAL WOODWORK
ARCHITECTURAL METALWORK • LIGHTING • HEATING

CONTRACT DEPARTMENT

MAPLE & CO. LTD. TOTTENHAM COURT ROAD. LONDON • W1

in association with its subsidiary: H. H. MARTYN & COMPANY LIMITED, CHELTENHAM.

MC36

THE ERNEST OPPENHEIMER HOSPITAL. WELKOM, ORANGE FREE STATE

Builders :—
James Thompson Ltd.



AIR CONDITIONING, HEATING, ELECTRICAL & MECHANICAL SERVICES BY MATTHEW HALL (PTY.) LTD.

THE
MATTHEW HALL

GROUP OF COMPANIES

HEATING, AIR CONDITIONING, ELECTRICITY, SANITATION

ESTD. 1848



MATTHEW HALL

MATTHEW HALL HOUSE, DORSET SQUARE, LONDON, N.W.1.

Manchester • Glasgow • Bristol • Belfast • Dublin • Johannesburg • Germiston • Durban
Cape Town • Welkom • West Indies • Lagos • Bulawayo • Salisbury (Central Africa)

WOOD—nature's best building material

CANADIAN White Pine...

—a light-in-weight creamy white wood used extensively
where long life is of greater importance than high strength

*You are invited to visit the
Canadian Timber Exhibit
at the*

**BUILDING
EXHIBITION
OLYMPIA, LONDON**

**November 16th—30th
1955**

Stand No. 534 & 535

**The Gallery,
NATIONAL HALL**

FOR FURTHER INFORMATION

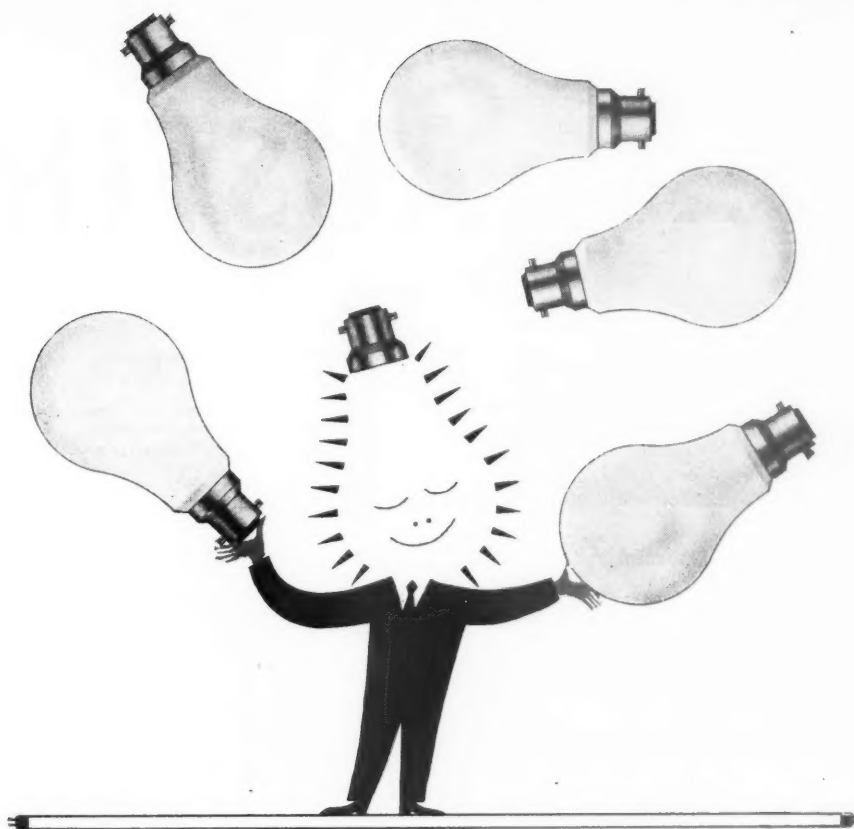
concerning Canadian woods contact The
Commercial Secretary (Timber), Canada
House, Trafalgar Square, London.



TIM 5

Reproduced here is figure of Canadian White Pine

This advertisement is one of a series featuring Canadian Douglas Fir, Spruce, Red Pine,
Pacific Coast Hemlock, and Western Red Cedar



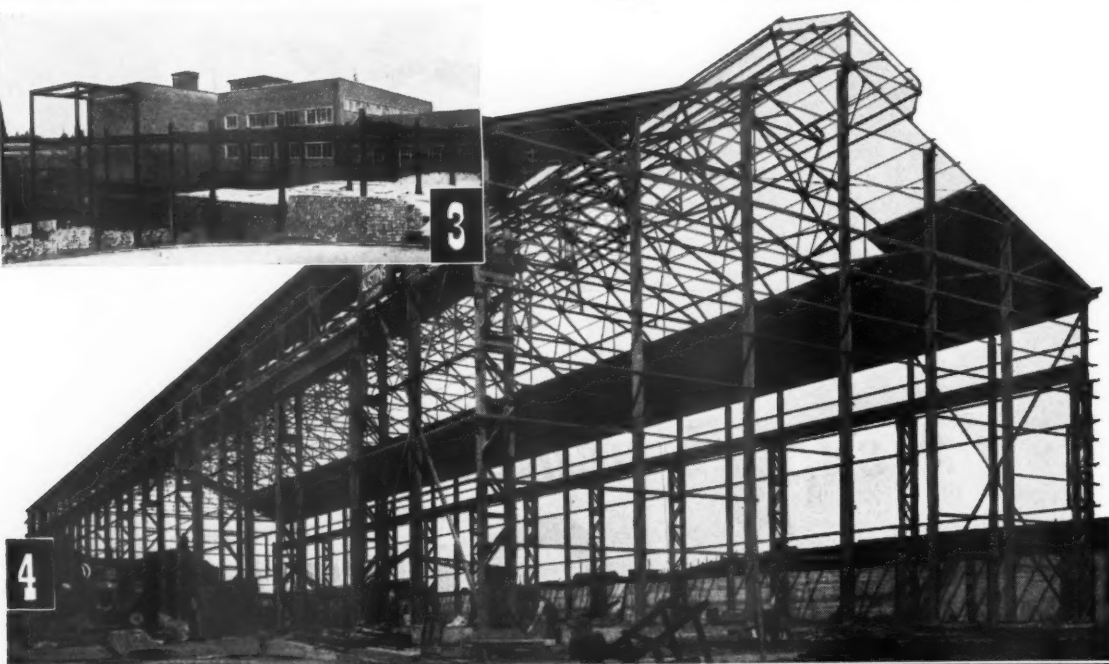
A superb achievement...

*The highest standard
of performance known
to the lighting industry.*

Osram
THE WONDERFUL LAMP

A **G.E.C.** product

The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2



STRUCTURAL STEELWORK by **AUSTINS**

- 1** New Stores Building for Messrs. Birlec Ltd.,
Furnace Manufacturers, Erdington, Birmingham.
- 2** Interior view of factory for Messrs. Brook Motors
Ltd., Barnsley.
- 3** Extension to factory for Messrs. F. E. Fox & Son Ltd.,
Biscuit Manufacturers, Batley.
Architects: Smith & Curry, A/R.I.B.A., Heckmondwike.
- 4** Fabrication shop for prefabricating ships for
Messrs. Clelands (Successors) Ltd., Wallsend-on-Tyne.



JAMES AUSTIN & SONS (DEWSBURY) LTD
STRUCTURAL ENGINEERS · DEWSBURY · YORKSHIRE

Telephone: 1750 (7 lines)

Telegrams: AUSTINS, DEWSBURY

Associated Companies:

ASTLEY, BROOK & CO. LTD., ST. GEORGE'S WORKS, HUDDERSFIELD · A. J. RILEY & SON LTD., VICTORIA WORKS, BATLEY

FIRE-

what is the menace?

A building may be inconvenient, ugly, noisy or unhealthy, without being more than a nuisance to its occupants – BUT IF IT IS A FIRE-TRAP, IT IS A **PUBLIC MENACE.**

which is the best wall lining?

"Plaster, being made of sand and calcium sulphate is incombustible and highly fire-resisting as a material. When it is reinforced and thereby held in position by wood laths or better still by metal mesh, its resistance is valuable... Fire has been known to rage fiercely for a time in the flue-like spaces inside a stud partition while the plastered faces remained intact." From 'Fires in Buildings – the behaviour of materials in fire' by Bird & Docking.

why is Gypsum plaster the best?

FIRE RESISTANCE. "MURITE" Plasters when set revert to Gypsum. This mineral contains 20% of chemically combined water which must be driven off before dangerous temperatures can be reached. This water barrier is one of the reasons why 'MURITE' Gypsum Plasters have such excellent fire-resisting properties.

GYPSUM PLASTER

**QUITE INCOMBUSTIBLE
FULLY FIRE RESISTING**

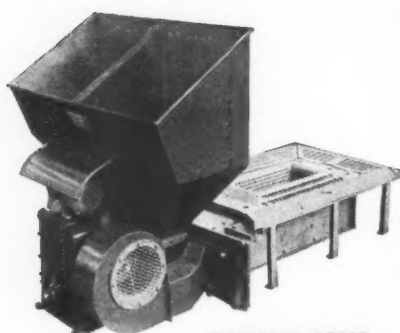
CAFFERATA & CO. LTD.

NEWARK-UPON-TRENT, NOTTS.

TELEPHONE: NEWARK 2060

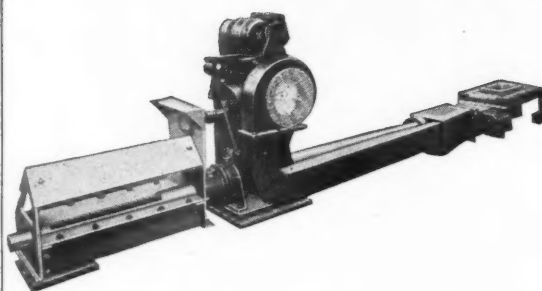
TELEGRAMS: "CAFFERATA. NEWARK"





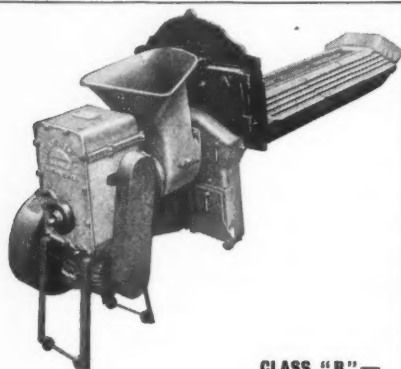
INDUSTRIAL ROBOT —

Hopper feed. For the larger vertical boilers, water tube and locomotive boilers, hot water and steam heating systems and steam processes.



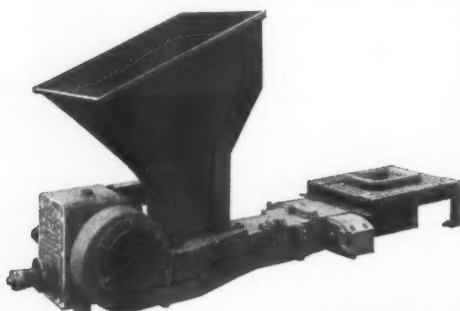
DIREKTO —

Bunker feed. For sectional boilers in domestic hot water and space heating systems. Also for vertical boilers used in steam-raising. Feeds direct from bunker to boiler *below floor level*.



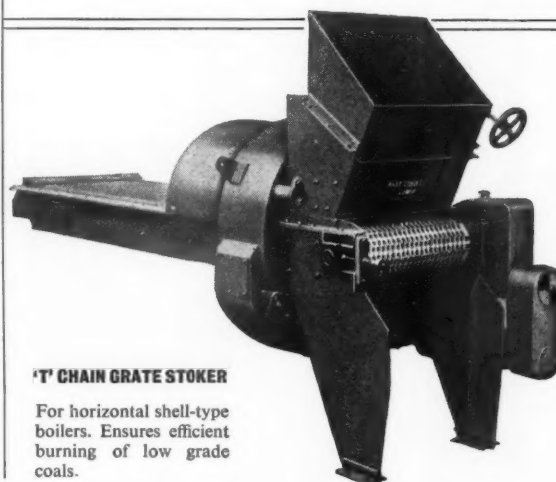
CLASS "B" —

Hopper feed. For Cornish, Lancashire and Economic boilers. Specially designed with grate to fit into circular furnace flues.



RILEY ROBOT —

Hopper feed. Suitable for sectional boilers in domestic hot water or space heating systems—and vertical boilers for steam-raising.



'T' CHAIN GRATE STOKER

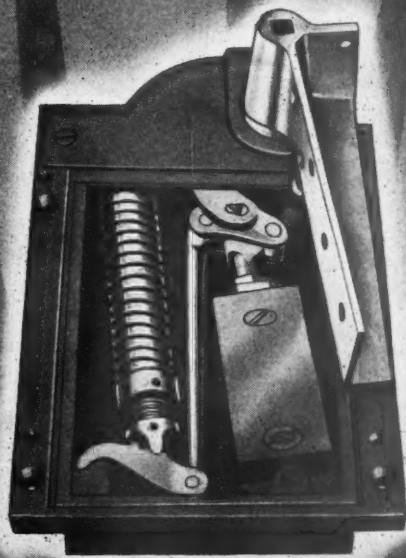
For horizontal shell-type boilers. Ensures efficient burning of low grade coals.

A RILEY STOKER FOR EVERY TASK

To get the best out of a boiler keep it burning contentedly with a Riley Stoker. Over fifty years' experience of mechanical stoking methods is concentrated into every Riley design. Special advantages include efficient smokeless combustion with small bituminous coals, and close control of temperature and pressure to suit the boiler load by automatic adjustments of coal and air.

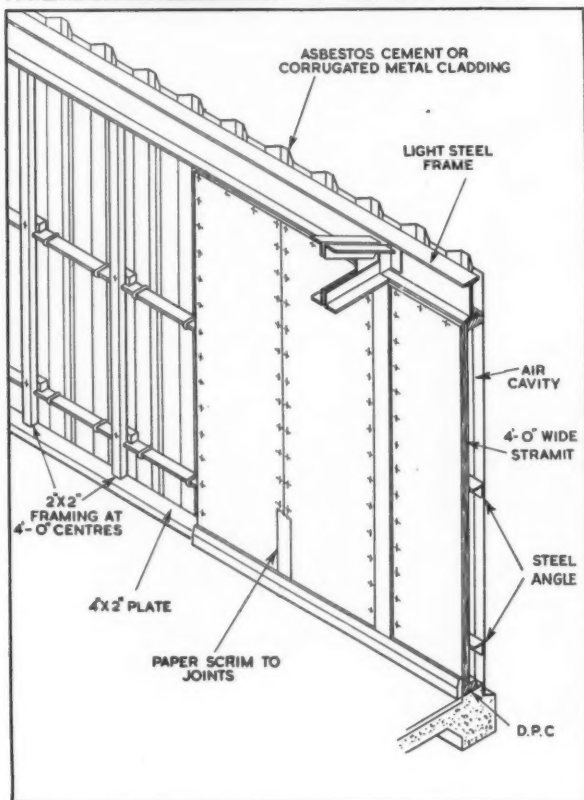
RILEY (IC) PRODUCTS LIMITED

Mechanical Stokers • Syntron Electric Vibratory Equipment • Member of the International Combustion Organisation
NINETEEN WOBURN PLACE • LONDON • WC1 • TELEPHONE: TERMINUS 2622



DOOR SPRINGS

ROBERT ADAMS (VICTOR) LTD
139, STAINES ROAD, HOUNSLOW, MIDDLESEX
Telephone: HOUnslow 5714



**No other building slab
possesses
ALL these properties.**

As well as being invaluable for reducing heat losses, Stramit confers all the benefits of a low-cost dry construction. ★ It is pre-cut to size to save time on site and to avoid cutting to waste. ★ It has light weight combined with great strength and rigidity. ★ On flat roofs no screeding is required. ★ It has a good fire-resistance classification and high degree of sound absorption.

2 in. thick; 4 ft. wide; any length (stock lengths:—8, 9, 10 and 12 ft.) Available from stock through leading merchants.
Send NOW for YOUR copy of our fully detailed TECHNICAL BROCHURE (SJO) and Building Research Station Reports.

STRAMIT

2" BUILDING SLABS

AND U

—the measure of heat-loss through a construction, in B.Th.U.'s per hour, over one square foot of its area, when the temperature-difference between its two sides is 1°F.

Gone are the bad old days when consideration of the U-factor was the monopoly of theorists. Nowadays, every architect and building owner is very much alive to the vital importance of reducing fuel consumption by keeping heat losses down to a minimum.

The 'U' value of corrugated asbestos sheeting bolted to normally spaced light steel wall-framing is 1.15. By adding Stramit, nailed to timber-battens, with 2 in. air cavity between asbestos and slab, as shown, this 'U' value is improved to 0.19—a reduction in heat-loss of over 83.5 per cent.

A simple calculation will show how much fuel this would save per annum in that new building you are planning and how much smaller your heating plant can be. In many cases the reduced size of the heating plant more than offsets the cost of the Stramit insulation.

STRAMIT BOARDS LTD • PACKET BOAT DOCK • COWLEY PEACHEY • UXBRIDGE • MIDDLESEX • WEST DRAYTON 3021

C

arpets in the public eye

5. Manfield Shoe Store New Street, Birmingham



Carpets for the branches of Manfield & Son Ltd. were designed to provide a quietly luxurious background for the selling and display of many styles and colours of shoes.

The carpets selected for all the branches of Manfield & Son Ltd. had to be attractive but unobtrusive, hardwearing and appropriate to the standardised decor of this chain store group. In a shoe shop customers see the merchandise on their own feet, and the carpet with its luxury and soft tread sets the stage for the important job of salesmanship. The colours of the carpets chosen by Manfields were silver grey for the ladies' sections and fawn or donkey brown for the men's departments, as these neutral but not too delicate shades bring out to the best advantage the styles and colours of the shoes. The all-over pattern, with its pleasant two-tone effect, ensures that the carpets do not soil easily and continue to look

attractive in spite of the constant and heavy traffic.

Carpets are the foundation of every decorative scheme, and they should be chosen with the practical considerations of maintenance in mind.

There's a carpet for every kind of store or shop, and if hard wear and long service are required, then the choice can only be an all-wool British carpet.

CHOOSE

**BRITISH CARPETS THAT
CARRY THIS LABEL**



BEST OF ALL — CHOOSE ALL WOOL CARPETS

*British Carpets Promotion Council, Dorland House,
18-20 Regent Street, London, S.W.1. TRAJalgar 4651-4658.*



Messrs. Owen Owen of Coventry

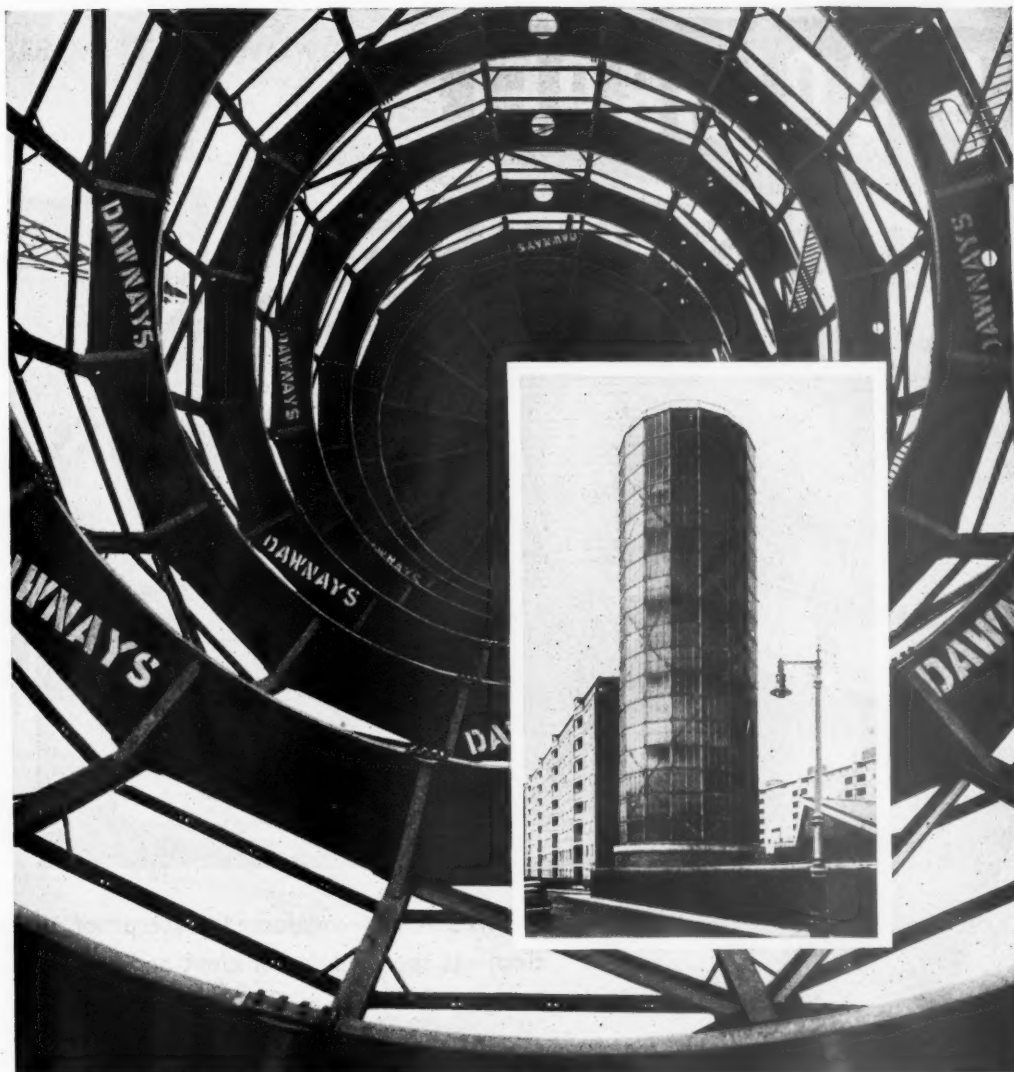
Architects: Hellberg & Harris
F/A.R.I.B.A.

GEORGE PARNALL

AND COMPANY LIMITED

CRAFTSMEN AND DESIGNERS

4 BEDFORD SQUARE · LONDON · W.C.1 MUSEUM 7101



ACCUMULATOR ENCLOSURE STRUCTURE FOR PIMLICO DISTRICT HEATING SCHEME

Consulting Engineer: S. B. Donkin, Esq., M.I.C.E., M.I.Mech.E., M.I.E.E.
Consulting Structural Engineers: Messrs. Scott & Wilson, Kirkpatrick & Partners

DAWNAYS LIMITED

BRIDGE AND STRUCTURAL ENGINEERS

HEAD OFFICE: STEELWORKS RD., LONDON, S.W.11 : Telephone BATTERSEA 2325

King's Dock Works SWANSEA 50471	East Moors Works CARDIFF 23336	54 Victoria St., London, S.W.1 VICTORIA 1541	Bridge Rd. Works WELWYN GDN. 3913	Thorpe Works NORWICH
Waterloo Bldgs., London Rd. SOUTHAMPTON 22474	40 Park Road PETERBOROUGH 4547	Great Field Lane., Marfleet HULL 32063	22 High Street ROMFORD 2104	7 The Close NORWICH 23141

Cables and Telegrams "DAWNAYS, LONDON"—Code Bentley's 2nd.

SISALKRAFT

FOR SARKING



1. Top sheet of Kraft paper.
2. First layer of bitumen
3. Longitudinal sisal fibres
4. Cross sisal fibres
5. Second layer of bitumen
6. Bottom sheet of Kraft paper

SISALKRAFT—reinforced, waterproof, pliable and clean—is specified for efficient and economical roof lining.

SISALATION (Reflective Insulation) has all the virtues of SISALKRAFT with bright aluminium foil, on one or both sides, for highly effective THERMAL insulation. Technical information and samples on request.

SISALKRAFT

TRADE MARK

the Supreme Building Paper

J.H. SANKEY & SON, LTD

ESTD. 1857

Sole Distributors for British Sisalkraft Ltd.

ALDWYCH HOUSE, ALDWYCH, LONDON, W.C.2

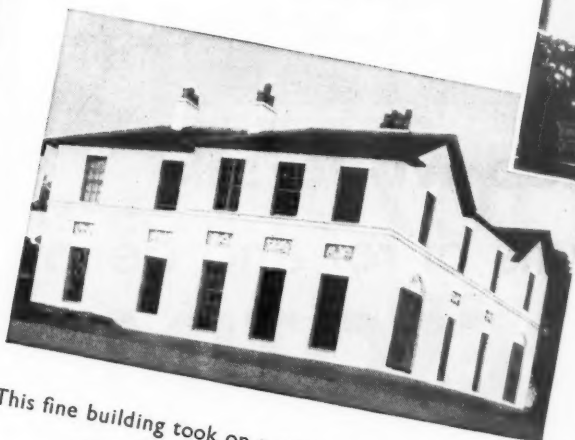
Tel. HOLborn 6949 (20 lines).

'Grams: Brickwork, Estrand, London

FROM THE SNOWCEM FILE:—

Madeley Manor, Madeley, Staffs.

Enhancing the Classic



Madeley Manor is the
headquarters of
Corney (Construction) Ltd.,
Building and Civil
Engineering Contractors

This fine building took on a new air of grandeur when painted with White SNOWCEM.
SNOWCEM is easily applied to concrete, cement rendering or suitable brickwork by
brush or spray. Available in seven colours: White, Cream, Mid Cream, Buff, Pink,
Silver Grey, and Pale Green.

SNOWCEM



WATERPROOF CEMENT PAINT
Decoration PLUS protection at LOW cost

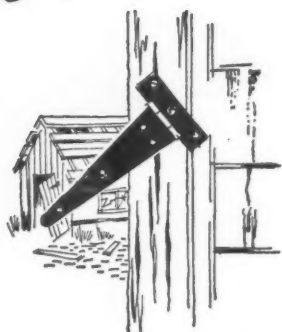
★ BRITISH CEMENT IS THE CHEAPEST IN THE WORLD

This water
does not brush, peel or flake off

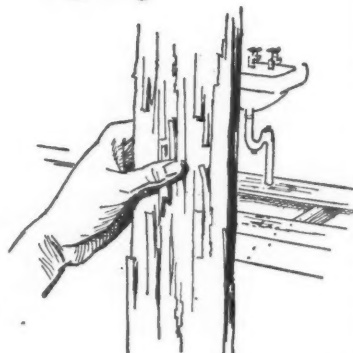
THE CEMENT MARKETING COMPANY LIMITED
Portland House, Tothill Street, London, S.W.1
or G. & T. EARLE LTD., HULL
THE SOUTH WALES PORTLAND CEMENT & LIME CO. LTD
Penarth, Glam.

T1955D

Exposure!



Dry Rot!



Insects!



To keep **wood** safe
from all forms of rot and decay
use **PRESOTIM**

Presotim is a decorative wood preservative produced from a series of highly refined coal-tar oils blended to provide extra-deep penetration even when applied by brushing.

Presotim is effective against timber decay whether caused by fungi, exposure, or attack by insects such as Death Watch Beetle and Furniture Beetle.

Presotim is recommended for use both outdoors and indoors. Presotim (exterior quality) is suitable for pavilions, outbuildings, fences, gates, boats, barges, and for roof timbers in houses. Presotim (interior quality) preserves panelling, doors, skirtings, etc., without obscuring the natural beauty of the grain.

Presotim is prepared in a special "neutral" grade which makes it especially effective for old and valuable timbers such as church roofs and panelling, where it protects without altering the characteristic colour of the wood.

Presotim-treated timber can be polished or varnished as required.

For work where a thoroughly reliable, well-tried wood preservative is needed, Presotim offers to architects, builders and others long-term protection against decay at very low cost.

HOW PRESOTIM IS SUPPLIED

Presotim is marketed in small containers, 5, 10, and 40-gallon drums. It is available in neutral grade, three shades of brown and twelve other attractive colours. Prices from 4/- per gallon in 40-gallon drums.

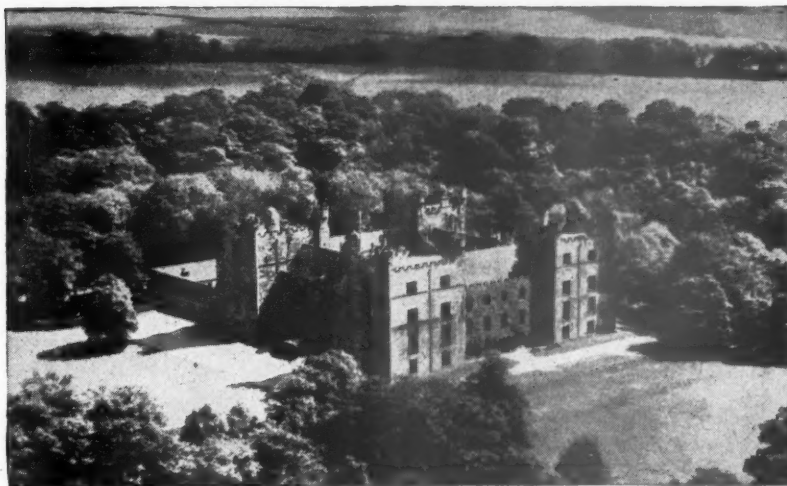


Manufactured by

THE NATIONAL COAL BOARD

For further details and advice on any technical problem, please write to National Coal Board,
By Products, National Provincial Bank Buildings, Docks, Cardiff

Magnificent Lumley Castle, Durham Seat of the Lumley family since the thirteenth century was recently completely redecorated; British Paints were granted the exclusive privilege of supplying all materials.



Where **TRADITION** *means so much*

Interior aspects of this historic building show how the discreet but effective use of modern materials can provide adequate protection and still be in harmony with the essentially dignified character of the famous interiors, designed by Sir John Vanbrugh in 1721.

Wherever there is need for decorative materials of the highest quality and finish, the experienced advice of British Paints Limited is gladly at your disposal.



BRITISH PAINTS LIMITED



Portland Road, Newcastle upon Tyne, 2.
Telephone : 25151.

Crewe House, Curzon St., London, W.1.
Telephone : Grosvenor 6401-5.

The Garter Room (above) and The Vanbrugh Corridor.

Decorated throughout with British Paints Limited materials by W. Curry Limited, Chester-le-Street, County Durham. The exterior photograph is by Aero Pictorial Limited.

PARK YOUR CYCLES THE **ODONI** WAY
(Regd. Trade Mark)

WITH ODONI PATENT "ALL-STEEL" BICYCLE STANDS

TYPES TO SUIT ALL POSSIBLE REQUIREMENTS, FOR INDOOR OR OUTDOOR USE.
SINGLE- OR DOUBLE-SIDED. HORIZONTAL OR SEMI-VERTICAL.



ILLUSTRATION OF TYPE 5

Double-sided horizontal stand
as supplied to Cheshunt
Grammar School (Hertford-
shire County Council)

Ground frame width 9'-1"

Roof span 14'-0" (chord)

Supplied in any even-numbered unit
from 16 cycles.

*We are at your service for
planning the maximum
accommodation in the
minimum area.*

Full details from the Sole Manufacturers and Patentees:

ALFRED A. ODONI & CO., LTD.
SALISBURY HOUSE,
LONDON WALL, LONDON, E.C.2

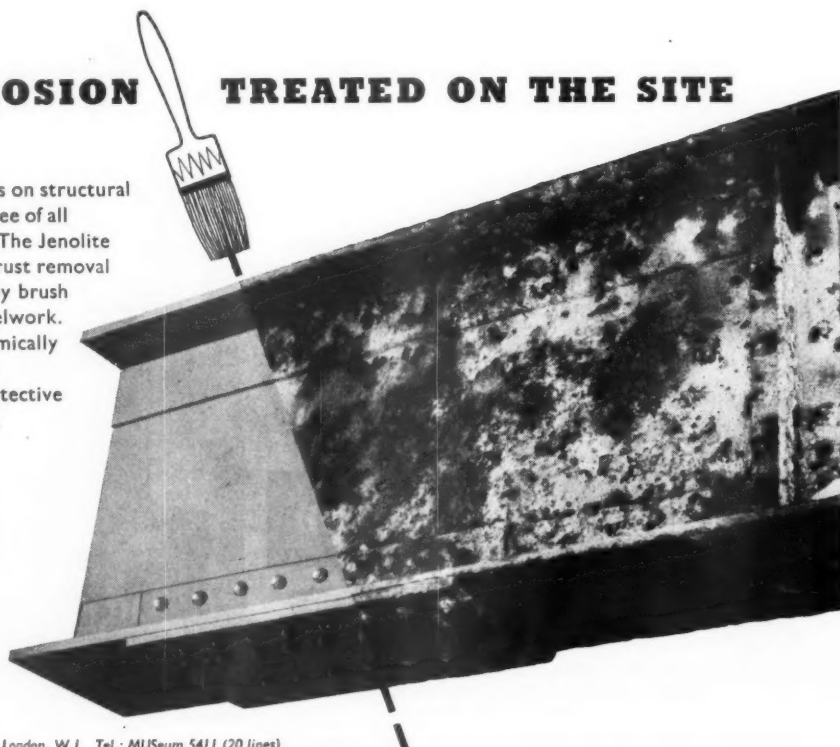
Telephone: NATIONAL 8525/6
Telegrams: Odoni Ave London

CORROSION TREATED ON THE SITE

It is vital that painting systems on structural steelwork be applied to surfaces free of all evidence of corrosive media. The Jenolite process, involving simultaneous rust removal and phosphating, may be applied by brush during and after erection of steelwork.

It ensures the provision of chemically clean surfaces affording the most efficient foundation for protective coatings of every kind.

The Jenolite Technical Service includes free, on-the-site inspection and expert recommendations for the lasting protection of steel structures.



LONDON: 13-17 Rathbone Street, London, W.1 Tel.: MUSeum 5411 (20 lines)
GLASGOW: Jenolite House, 304 High Street, Glasgow, C.4 Tel.: BELL 2438/9

AP 263/110

THE BUILDING CENTRE

The function of the Building Centre is to provide facilities for manufacturers to exhibit objects and materials used in connection with the erection and equipment of buildings, lighting, heating, decoration, etc., so that the Architect and Architectural Student can see in one building examples of the most up-to-date products from every branch of the manufacturing world connected with building.

It is a non-profit distributing organisation and exists for the benefit of the Architectural and Surveying Professions, the Building Industry generally and the Public interested in Building.

It maintains a highly organised technical information service which is available free to all concerned, for use by personal interview, correspondence or telephone.

9.30 a.m. to 5 p.m.
(Saturdays 1 p.m.)

Store Street
Tottenham Court Road,
LONDON, W.C.1.
Museum 5400 (10 lines)

FOR ARCHITECTS AND SURVEYORS

- Wide selection of drawing instruments, slide rules and sundries, British and imported.
- Theodolites, Levels, etc., by leading makers. New and re-conditioned.

C. BAKER OF HOLBORN LTD.
244 High Holborn, London, W.C.1
HOLborn 1427/4004

MODELS

ESTAB.
1883

BY

John B. THORP

98 GRAY'S INN ROAD, W.C.1

FOR

TOWN PLANNING
PUBLIC BUILDINGS
ESTATES and
INTERIORS

Telephone:
HOLBORN 1011

FOUNDED 1882



The Institute of Clerks of Works of Great Britain (Inc.)

NORTHERN IRELAND CHAPTER
7 COLLEGE SQUARE NORTH, BELFAST. Hon. Sec.:
A. McBRIDE, 17 Kilmore Park, Belfast.

NORTHERN CHAPTER
139 ALBION STREET, LEEDS, 1. Hon. Sec.: J. HIRST,
9 Willowfield Crescent, Bradford 2.

SCOTTISH CHAPTER Royal Incorporation of
Architects in Scotland, 15 RUTLAND SQUARE,
EDINBURGH, 1. Hon. Sec.: R. G. JACK, 61 Drumbræ
South, Edinburgh.

NORTH WESTERN CHAPTER Manchester
Society of Architects, 16 ST. MARY'S PARSONAGE,
MANCHESTER. Hon. Sec.: W. H. SARGEANT, 232
Tunstall Road, Knyperley, Biddulph, Stoke-on-Trent,
Staffs.

MIDLAND CHAPTER Chamber of Commerce, 95
NEW STREET, BIRMINGHAM, 2. Hon. Sec.: N. E.
ORPIN, 129 Pinfold Lane, Penn, Wolverhampton.

ARCHITECTS, SURVEYORS, ENGINEERS requiring Clerks
of Works are invited to apply to:

The Secretary,
W. J. GIBBINS, 5 BROUGHTON ROAD,
THORNTON HEATH, SURREY
Phone: THO 1238

Examinations will be held at the Royal Institute
of British Architects, 66 Portland Place, W.1, in
June and July, 1956 (dates next issue). Examinations
are also being held at 15 Rutland Square,
Edinburgh and the College of Technology,
Belfast, Northern Ireland.

ELEMENTARY QUANTITY SURVEYING

BY SIDNEY RALPHS

A.R.I.C.S., A.I.A.S., Associate Birmingham and Five
Counties Architectural Association, City and Guilds
Finalist, Part-time Lecturer at Birmingham College of
Technology

This new book provides students of Quantity
Surveying and those who feel the need for a
"refresher" course with a clear understanding of
the fundamental principles. In simple, elementary
language, and with a wealth of illustration, it
deals with the complete preparation of a Bill of
Quantities for an imaginary building and provides
detailed information on the items measured, the
build up and explanation of the descriptions.

383 pages. 25s. net

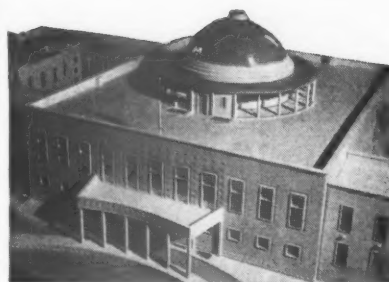
PITMAN

Parker St. Kingsway London, W.C.2

DYE-LINES, BLUE PRINTS, STATS, ETC.

Tracing and Drawing Office Supplies
KINGSTON PHOTOGRAPHIC AND DRAWING
OFFICE SUPPLIES LIMITED.

3 The Parade, London Road, Kingston-on-Thames
KIN 3911 & 6726



Royal Palace, Baghdad, made to the order
of Messrs. J. Brian Cooper, F.R.I.B.A.

REGAL PATTERN

Blue prints 'Come alive' . . . are woven into
a three-dimensional pattern of precision
in the 1-100th scale model shown here. Such
realism—fruits of a rare kind of craftsmanship
—make BASSETT-LOWKE models of infinite
worth to architects, engineers and municipal
authorities.

Executives and purchasing agents are
invited to request our Brochure S.W.43,
sent free.

Meticulous models by

BASSETT-LOWKE LTD.
HEAD OFFICE & WORKS: NORTHAMPTON

London: 112 High Holborn, W.C.1
Manchester: 28 Corporation Street.

TEA at the R.I.B.A. Club in the Gallery
at the BUILDING EXHIBITION

and a visit to the
F.C.B.M. STAND
(Just outside the Club)

Let us demonstrate how
Clinker Blocks combine
Thermal Insulation with
Load Bearing Capacity
and **Low Cost.**

Technical information sheets and advice are
available from:—

THE TECHNICAL OFFICER
**FEDERATION OF CLINKER BLOCK
MANUFACTURERS**

The Ridings, Surbiton, Surrey
Telephone: Elmbridge 3149

and at the
BUILDING EXHIBITION
Stand 409 (gallery)



THE SIGN OF QUALITY

Whatever the
job . . .



From the original by
Sir John Tenniel.
By courtesy of
Walt Disney

there's a
Duresco Product
for it

Our Technical Advisory Service is
unreservedly at your disposal with the
experience of close on a century's
specialised manufacture of . . .

decorative & protective coatings

DURESCO PRODUCTS LTD

The Inventors of Oil-bound Water Paints

LONDON, CHARLTON, S.E.7.
Tel. GREENWICH 0034/5/6

MANCHESTER, 68 GREAT DUCIE ST.
Tel. Deansgate 3161.

B.O.A.C.
**Steel roller
shutters
at London
Airport were
specially
designed
by
Milners**

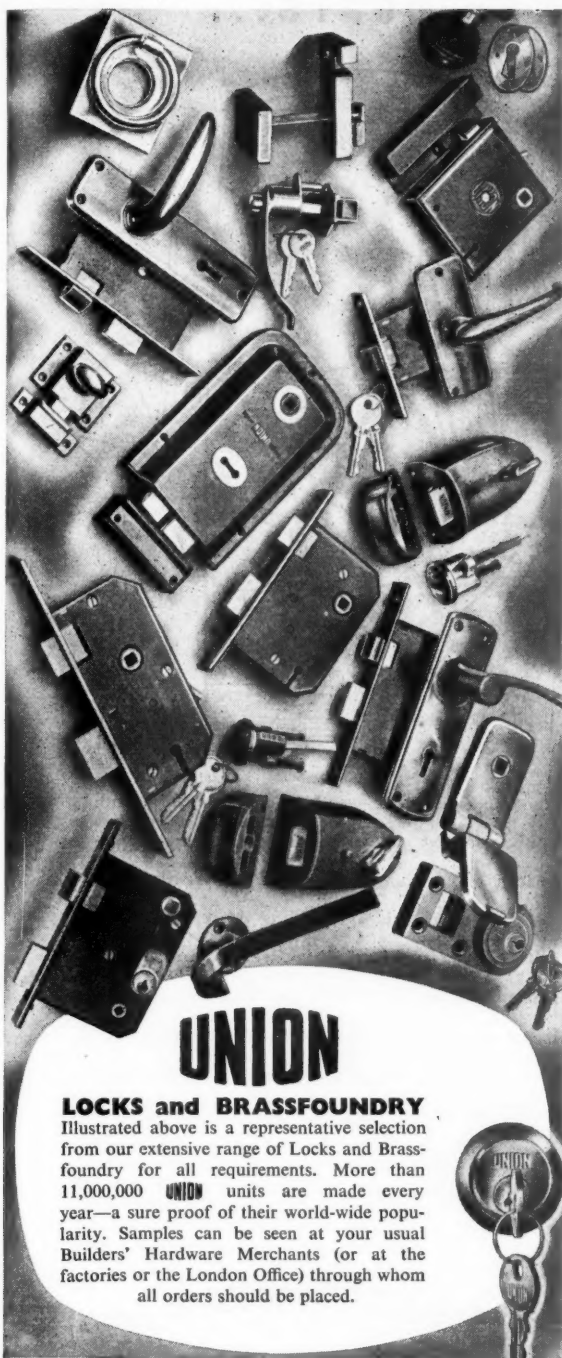


B.O.A.C. WENT TO MILNERS when they wanted to
create an effective system of fire protection for the
vast new hangar they were building at London
Airport. Steel roller shutters that can safely resist
fire were specially designed and manufactured for
the purpose by Milners. They embody the new
release and resetting mechanism patented by
Milners—the name inevitably linked with security.

MILNERS SAFE CO. LTD.

58 HOLBORN VIADUCT, LONDON, E.C.1

Telephone : CENTral 0041/5



UNION

LOCKS and BRASSFOUNDRY

Illustrated above is a representative selection from our extensive range of Locks and Brassfoundry for all requirements. More than 11,000,000 UNION units are made every year—a sure proof of their world-wide popularity. Samples can be seen at your usual Builders' Hardware Merchants (or at the factories or the London Office) through whom all orders should be placed.



JOSIAH PARKES & SONS LTD.
UNION WORKS, WILLENHALL, STAFFS. *Established 1840*

South African Factory: JOSIAH PARKES & SONS (S.A.) LTD., JOHANNESBURG
London Office: BUSH HOUSE, ALDWYCH, W.C.2

★ You can now have ★ CHANNEL REINFORCED ★ WOOD WOOL ROOFING SLABS ***PRE-PLASTERED***

2"
STANDARD
CHANNEL
REINFORCED



3"
REBATED
CHANNEL
REINFORCED



Thermacoust ... OF COURSE!

The new "THERMACOUST" pre-plastered channel reinforced roofing slabs have unique advantages. They save the cost of plastering, providing a smooth plaster ceiling surface, which will take any distemper or emulsion paint for use on plaster. In the one building unit they combine roof structure of exceptional strength, high thermal insulation and a ceiling finish equal to that provided by the most highly-skilled plasterer.

"THERMACOUST" pre-plastered roofing slabs consist of either 2" thick Channel Reinforced or 3" Rebated Channel Reinforced slabs which during manufacture have the surface impregnated with hard plaster for a thickness of about $\frac{3}{8}$ ". The channels are pressed on to the completed slabs, thus protecting the long edges of the plaster finish from damage during transit or handling. The pre-plastered slabs are available in 6' 0", 6' 8" and 7' 0" lengths.

For information sheets and prices, apply to:

T.19

Thermacoust Limited, 39 Victoria Street, London, S.W.1. (ABBy 2738)

YOU NEED FEWER COATS...



The high hiding power of modern white and light coloured paints is due to the exceptional opacity of Titanium Oxide which they contain.

Because of this high hiding power good results can be obtained on a well prepared and primed surface with only two coats of a paint based on Titanium Oxide whereas three coats would be necessary if a different white pigment were used.

Better paints always contain Titanium Oxide—the pigment for whiteness, opacity and durability.

Issued in the interest of better paintwork by

**BRITISH TITAN PRODUCTS
COMPANY LIMITED**
COPPERGATE
YORK



Factories at Grimsby and Billingham and at Burnie, Tasmania. Agents in most principal countries.

Building Research Station Digest

No. 81

SEPTEMBER, 1955

Artificial Lighting of Building Interiors: Lamps and Fittings

The general principles of lighting design have already been discussed in Digest No. 70. This Digest discusses some of the factors that determine the design of a satisfactory artificial lighting installation, particularly those affecting the choice of the lamps and fittings.

GENERAL DISTRIBUTION OF ARTIFICIAL LIGHT

Direct and indirect lighting

Artificial light can be distributed either directly from the light fitting or luminaire or indirectly from one or more of the surfaces in the room. Light fittings are classified according to the proportion of light they direct on to the object of attention. A luminaire that concentrates 90 per cent or more of its light downwards is classified as a direct fitting. A fitting designed to concentrate *all* the light downwards on to a table or work bench will be highly efficient so far as the direct utilization of the light is concerned. It is generally inadvisable, however, to rely exclusively on such a fitting to provide all the illumination required, as this will cause strong contrasts of light and shade, particularly if the fitting is seen against the background of the relatively dark ceiling. Such contrasts become uncomfortable and the sense of gloom resulting from the low brightness of the ceiling will be unsatisfactory for most interiors. Luminaires with this kind of distribution may be acceptable for display purposes, where the object is to secure immediate attention at the point of interest rather than to facilitate the performance of a sustained piece of work. Small pools of direct light from low power sources may also be used to provide areas of local interest or intimacy, as for example in a house or the lighting of tables in a restaurant. Nevertheless, with such exceptions, the general illumination will be much more satisfactory if a certain amount of light is provided for the rest of the interior so that the contrasts between the well lit and the shadowed parts of the room are not excessive.

In contrast, there is the totally indirect system of illumination where all the light is thrown upwards upon the ceiling, with complete screening of the sources eliminating any risk of glare. The

main criticism of such systems is that they give a shadowless form of lighting that eliminates any subtleties of surface modelling or texture. Another disadvantage is that the ceiling is the brightest surface in view and, being large, is distracting. In terms of light utilization an indirect lighting installation will be less efficient than a direct system, owing to the absorption of light at each reflecting surface—even a white ceiling may well absorb 20 to 30 per cent of the incident light.

With the so-called luminous ceiling in which the lamps are fixed above a layer of translucent material the whole or part of the ceiling becomes the source of light. The effect is very similar to that obtained from an indirect lighting system because, despite the high level of illumination provided, the ceiling is the brightest surface of large area within view.

An indirect lighting system may be desirable in special cases, but for close work it does not cater for the fact that the eye can concentrate more easily and for longer periods on an object that is somewhat brighter than its surroundings.

For most purposes therefore, neither a wholly direct nor a wholly indirect system of lighting will be satisfactory. Usually a combination of the two forms is required, either from dual-purpose fittings that provide both direct and indirect lighting or from a combination of fittings.

Brightness of the surroundings

The brightness relationships of the lighting fittings and the main surfaces within the field of view are important. To avoid glare and distraction the brightness of the light fittings themselves must be kept within limits and the brightness relationships of the whole environment must also be considered. Ideally, the decorations and furniture should be considered when the lighting installation is designed but this is not always possible. It is necessary to find a balance between extreme contrasts, which are generally uncomfortable, and complete uniformity, which may be soporific. Attention to a task is facilitated by a relatively bright centre to the field of view, not contrasting too strongly with the brightness of surrounding surfaces.

Control of brightness gradation

The brightness or luminance of a surface depends on the amount of light it receives and on its reflection factor. For example, white paper may have a reflection factor to "daylight" fluorescent lamps of 84 per cent; its luminance under an illumination of 10 lumens per square foot (foot candles) from this lamp would therefore be 8.4 foot-lamberts, whereas the luminance of an orange painted wall of reflection factor 33 per cent, would be only 3.3 foot-lamberts. Reflection factors of room surfaces can be obtained by comparison with samples given in a standard paint range card such as the "Archrome" range of colours described in the Ministry of Education Building Bulletin No. 9 or the new British Standard range of paint colours for buildings to be published shortly; in both, the colour patterns are arranged to conform to nine steps of lightness from light to dark.

Where the reflection factor of the object of attention is higher than that of the surroundings, a satisfactory grading of the brightness may be achieved with uniform illumination, perhaps with one or two intermediate steps in reflection factor. For instance, an improvement in visual comfort can be easily obtained by changing a dark desk top for one of moderate lightness intermediate between that of the white paper and that of the surrounding parts of walls or floor in the field of view. If the object of attention has a low reflection factor in comparison with the surroundings, then reliance must be placed on preferential illumination by the use of supplementary local lighting or by a suitable arrangement of the general fittings.

THE SELECTION OF LIGHT SOURCES

The considerations which determine the choice of light source are mainly dependent on the type of building to be lighted. In small installations levels of illumination and colour of the source are likely to be decisive factors and questions of running cost and efficiency may be unimportant. In large industrial installations however, the latter factors are usually paramount and a careful assessment has to be made of such matters as capital costs of fittings, auxiliary equipment and wiring, running cost of electric current, maintenance charges including lamp replacement and cleaning costs and hours of use of the installation.

For offices and shops it is often a straight choice between tungsten and fluorescent lamps. For the variable requirements of industrial buildings the choice will depend on the particular conditions. For instance, in a heavy engineering shop with overhead cranes, necessitating a high roof, a relatively small number of compact high-powered lamps, e.g. mercury-vapour or sodium-vapour discharge lamps, or high-wattage tungsten filament lamps, may be chosen to provide the required illumination with the minimum of obstruction.

The limits of adequate illumination are discussed in Digest No. 70 and some examples are given. These examples are taken from the I.E.S. Code* which gives recommended values of illumination for a large variety of visual tasks and industrial operations, with a method of assessing the illumination required for any given task of known detail size and contrast. The calculation of the light-output requirement for a given level of illumination is a specialized job; it is outside the scope of the present Digest.

Types of lamp

The following are the main types of lamp available: incandescent tungsten-filament lamps; plain metallic (mercury or sodium) vapour discharge lamps; colour-corrected discharge lamps; hot-cathode fluorescent lamps; cold-cathode fluorescent lamps. In general, the production of light by passing an electric discharge through a gas or vapour as in discharge lamps is more efficient than heating a tungsten filament and the life of such lamps is longer.

Metallic-vapour discharge lamps. These comprise the mercury-vapour and sodium-vapour lamps widely used for street lighting. Where the distorted colour rendering is of little consequence they may be used for industrial interiors but there is an increasing tendency to use them with some form of colour correction. This may be effected by blending the light from mercury-vapour lamps with tungsten-filament lamps or by using mercury discharge lamps with an outer bulb coated with fluorescent material. Discharge lamps need auxiliary gear to control starting and running.

Hot-cathode fluorescent lamps. Essentially, the common fluorescent lamp is a low-pressure mercury-vapour discharge lamp which utilizes the ultra-violet radiation from the discharge to excite a coating on the inside of the lamp so that it fluoresces. The colour of the light emitted depends on the chemical composition of the coating. The lamp is made in tubular form ranging from 18 in. to 8 ft long, according to the wattage and is designed to operate at mains voltage. The lamps need auxiliary gear to control starting and running.

Cold-cathode fluorescent lamps. These are similar to hot-cathode fluorescent lamps but they operate at a higher voltage and require a transformer but no starting gear or ballast. The capital cost of the lamps and equipment is usually higher than that of hot-cathode lamps and equipment to give the same light output, but the main advantage is the longer life of the lamps (15,000 hours is usually claimed). Other advantages are that these lamps may be dimmed and operated on a reduced supply voltage if necessary, and

* I.E.S. Code for the Lighting of Building Interiors. The Illuminating Engineering Society, London, 1955.

TABLE 1

Lamp	Rated life (hours)	Average efficiency (lumens per watt)	Remarks
Tungsten filament (230 V)			
100 watt	1,000	12	Give approximate natural colour rendering of objects
200 "		13.6	
500 "		15	
Plain metallic-vapour discharge:			
Mercury 400 watt	4,000	34	Emits light mainly of blue-green colour
Sodium 140 watt	4,000	65	Emits light of yellow colour
Mercury-tungsten 500 watt	3,000	21	Tungsten filament incorporated to improve colour of light
Colour-corrected discharge lamps:			
Mercury-fluorescent	4,000	32-40	Bulb coated on inside with fluorescent powder to correct colour
Fluorescent tubes:			
Hot cathode	5,000	27-50	Colour of light emitted depends on powders used for coating inside of tube
Cold cathode	15,000	20-28	

that the surface brightness of the tube is less than half that of the corresponding hot-cathode lamp. Coupled with the fact that the diameter of the tube is quite small (20 mm) this means that under certain conditions it may be possible to relax some of the requirements mentioned later for the screening of light sources.

Some of the characteristics of lamps are summarized in Table 1.

Efficiency of lamps

The efficiency of an electric lamp is expressed as the ratio of light output to the electrical energy consumed within the lamp and for most types is related to their life performance. With any particular tungsten-filament lamp, the efficiency can be raised by increasing the current passing through the filament, but the life of the lamp will thereby be reduced. Conversely, the life can be prolonged indefinitely by reducing the current through the filament (e.g. by using the lamp on a supply of lower voltage than that for which it was intended) but the efficiency will be reduced, and the cost of electricity for a given amount of light energy will be high. A compromise between life and efficiency has been reached for tungsten-filament lamps by standardizing on a life of 1,000 hours. British Standard 161, "Tungsten-filament general service electric lamps," gives details of the specified light output and life performance of the common types of filament lamp. Most makes of lamp are now produced to this specification.

The light output of a filament lamp will not decrease noticeably until nearly the end of its life, i.e. when complete failure occurs; the light output of a fluorescent lamp falls slowly but continuously throughout its life, and the lamp may continue to function until the light output has dropped below a useful value. There has been

until recently some confusion about the figures claimed for the life of fluorescent lamps by different groups of manufacturers but it is now generally agreed in this country that the specified life of a hot cathode fluorescent lamp should be 5,000 hours, and it is understood that a revision of B.S. 1853, "Tubular fluorescent lamps for general lighting purposes," shortly to be published, will specify this value.

Efficiency and colour

The incandescent tungsten-filament lamp emits light that is predominantly red in colour and rather deficient in blue but for general purposes the colour rendering of objects under tungsten lamps is accepted as natural and the predominance of red is of little consequence. The rated efficiency of fluorescent lamps varies with the colour of the light produced. Three factors should be considered when choosing the colour of a fluorescent lamp: (a) colour appearance of the source itself, (b) the efficiency with which that colour of light can be produced and (c) colour-rendering properties of the light. The colour of the light emitted is determined by the fluorescent powder or combination of powders in the tube coating. Powders fluorescing with different colours give widely differing efficiencies, and the production of reasonable distribution of light throughout the spectrum necessitates the use of some of the less efficient materials; light that appears white does not necessarily give the same rendering of the colours of objects as that obtained with daylight. Some small colour distortion, however, is frequently acceptable, so that the range of commercially available lamps includes those of high efficiency as well as those of improved colour rendering. Lamps giving various colours are now standardized as follows: (i) "Colour matching" and "North light"—These

two lamps are equivalent and give a light similar in appearance and in colour rendering properties to north sky light.

The light is rather "cold" for most lighting purposes, and is 25 per cent to 35 per cent less efficient than type (ii).

(ii) "Daylight" gives a cool light with less satisfactory colour rendering properties than (i) but is more efficient.

(iii) "Natural" gives white light with better colour rendering properties than (i) but about 15 per cent less efficient.

(iv) "White", "Warm white"—These two have high efficiency (up to 10 per cent higher than (ii)) and give a warm light, but the colour rendering does not correspond closely with that obtained either by daylight or by filament lighting.

(v) "De-luxe warm white" gives a warm coloured light that matches tungsten-filament lamps with reasonably good colour rendering properties. The efficiency however is down to the level of type (i).

(vi) "Peach" or "Mellow"—These lamps are suitable where particularly warm and comfortable illumination is required. The colour rendering does not correspond closely to that of daylight or filament light. The efficiencies are comparable with those of group (i).

Efficiency and wattage

For a given colour, the efficiency of light production of a fluorescent lamp is governed by the electrical loading (i.e. watts per foot length of tube). Thus a 40-watt—4-ft lamp will be slightly more efficient than an 80-watt—5-ft lamp, but a 40-watt—2-ft lamp will be much less efficient than either.

The efficiency of light production of a filament lamp is also dependent on the loading but it increases as the lamp current increases. Thus a 230-volt 500-watt (2.17 amp) lamp will have higher efficiency than a 230-volt 40-watt lamp (0.17 amp) and a 100-volt 500 watt (5 amp) lamp will have a higher efficiency than either.

Comparison of lamp efficiencies

The efficiency usually quoted for a fluorescent or other discharge lamp takes into consideration only the power consumed in the lamp, and ignores the losses in the auxiliary gear necessary for running the lamps. The values given must therefore be reduced by about 10 or 20 per cent to allow for these losses, the exact figure depending on the type of gear. A fluorescent lamp with good colour rendering properties such as the 80-watt "Natural" lamp may have an overall average luminous output throughout life of 3,100 lumens with a total load of 100 watts (for one type of auxiliary gear). Thus its efficiency will be 31 lumens per watt or about $2\frac{1}{2}$ times the efficiency of a 230-volt 200-watt tungsten-filament lamp. Cold cathode fluorescent lamps are made in a

similar range of colours to the hot cathode lamps, but have rather lower corresponding overall efficiencies.

The average efficiency of the corrected or uncorrected mercury lamps throughout life is of the same order as that of the tubular fluorescent lamps, but that of the sodium lamps (in the higher wattages) is of the order of twice that of the fluorescent lamps. The use of a tungsten-filament in the same outer bulb as a mercury discharge lamp avoids the use of a separate series ballast, as well as correcting the colour of the light emitted by the lamp. The overall luminous efficiency is, however, brought down to a level only slightly above that of an ordinary filament lamp of the same light output. Data on the light output of all these forms of discharge lamp are given in B.S. 1270, "Schedule of electric discharge lamps for general purposes".

Capital costs and running costs of light sources

When considering the economics of the various light sources, the following factors must be taken into account in addition to the relative efficiencies.

1. Numbers of fittings required.
2. Capital cost of the fittings, auxiliary gear and wiring.
3. Running cost of replacement of lamps (and starters—if any) taking into account their life and cost per lamp.
4. Running costs for labour in cleaning and relamping.
5. Maintenance costs for labour in cleaning and relamping.
6. Number of hours of use of the installation.

Generally, in planning a new installation, the increased capital and maintenance costs of the more efficient sources will be weighed against the savings in cost of energy consumed. It will usually be found that the increased capital cost is offset within a few years where the cost of electricity is high or the hours of use of the installation are long. Where the reverse conditions apply the saving in running cost does not usually offset the additional capital cost. For this reason tungsten-filament lighting is at present often preferred for the lighting of elementary and secondary schools that are seldom used at night.

Apart from the economic factors mentioned above there are a number of technical points to be considered, such as, the maximum power available in a single lamp, the frequency of replacement, the type of distribution obtainable with a particular shape of lamp, the heat that can be tolerated, the problem of providing better lighting in an existing building without increasing the load on the wiring. This last is a consideration that very frequently leads to the installation of fluorescent lighting to replace an existing filament lamp installation.

The design and selection of light fittings

The efficiency of the fitting, the proportion of

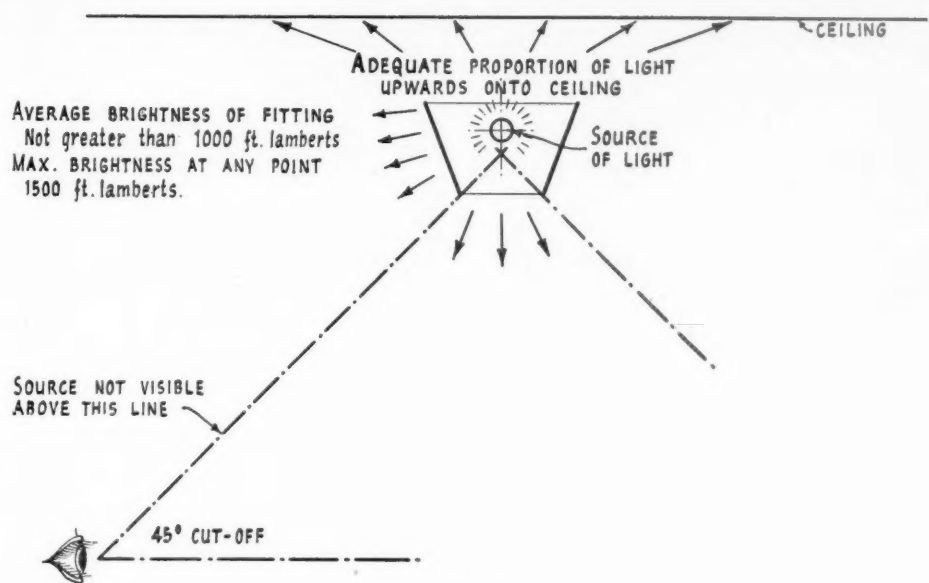


Fig. 1

direct to indirect light, the interrelation of fittings and room surfaces, and the reflection factors of the latter, all govern the proportion of the total light that eventually reaches the working plane. For purposes of illumination design tables have been prepared that enable allowance to be made for these factors and form a standard method of determining the energy required to provide a particular level of illumination. The tables are given in "Illumination Design for Interiors", The Lighting Service Bureau, London, 1951.

The efficiency of the fitting depends solely on the amount of absorption of light in transmission or reflection from the various components and a fitting that has many reflecting or diffusing surfaces will generally be less efficient than one with a small area of controlling surface. The way in which light is distributed by a fitting does not affect its overall efficiency although it does affect the proportion of light reaching the working plane.

If efficiency of light output is the only criterion on which the design of a lighting installation is to be based, then unscreened light sources supply the answer as no light is lost by absorption in the fittings. In general, however, it is preferable to sacrifice some efficiency in order to achieve a more comfortable environment, as when bright light sources are screened to avoid glare.

As a rough general rule, with an illumination of the order of 10 lumens per sq. ft on the working plane, no part of a lighting fitting that has an average brightness of over 1,000 foot-lamberts

(or a maximum of 1,500 foot-lamberts at any point) should be visible within an angle of less than 45° above the horizontal (Fig. 1). At the same time as much as possible of the upward light from the source should be allowed to fall on the ceiling, thus helping to avoid excessive contrasts.

These principles form a useful basis from which general-purpose ceiling fittings may be developed. They may be summarized and illustrated by an elementary lighting fitting of the type shown in Fig. 1. Figs. 2 and 3 show actual fittings designed in accordance with these principles.

Most lamps have a surface brightness of over 1,000 foot-lamberts; fluorescent lamps may have a brightness of twice this value. Some degree of screening or shading on the lines discussed above is necessary to prevent light from being emitted directly from the lamp at angles greater than 45° to the downward vertical. Where a translucent diffuser is used to screen the lamp, its distance from the lamp must be such that the average and maximum surface brightnesses do not exceed the limits previously mentioned.

Stricter limitations may apply in some cases. For example, in hospital wards, where patients are lying in bed and tend to look up at the ceiling, the cut-off may have to be considerably increased, or the use of ceiling fittings avoided altogether. By contrast, particularly in factories, the structural framework may provide the necessary cut-off, eliminating any need for fittings.

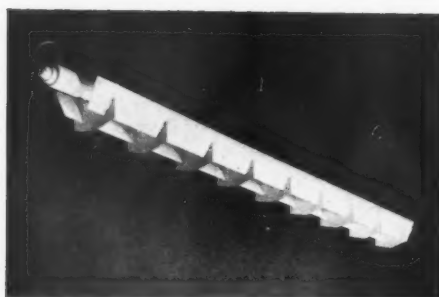


Fig. 2

Other practical aspects to be considered are ease of cleaning, maintenance and re-lamping. The simpler the design of fitting and the fewer the loose or intricate parts, the easier it will be to handle and the more likely to stay in good condition.

Depreciation of lamps and fittings

To allow for the deterioration of the fittings, the deposition of dirt and dust on them and changes in room surfaces, it is usually assumed that the average illumination in service will be about 80 per cent of the illumination with freshly cleaned surfaces. The designed illumination is, therefore, increased accordingly. The allowance is greater for a dirty industrial installation; in such conditions, where the atmosphere is also steamy or smoky, additional allowance must be made for the absorption of light before reaching the working plane and this may be as much as 50 per cent.

It is most important to clean lighting fittings regularly and to replace lamps before they



Fig. 3

actually fail. The accumulation of dust may pass unnoticed and, unless proper arrangements are made, the light output from the fittings is often seriously diminished before anything is done. The fittings should therefore be accessible and easily cleaned; otherwise cleaning is expensive or neglected.

With tungsten-filament lamps the replacement of a lamp can usually be undertaken by normal maintenance or cleaning staff. With fluorescent equipment, however, the service of someone with electrical experience is necessary to locate and replace the defective component. In a large installation, it may be most satisfactory to replace lamps in large groups at a time, regardless of their condition, when it is estimated that they have completed a substantial proportion of their expected life (for example 5,000 hours) or after a given percentage of the group (say 10%-15%) have already failed and have had to be replaced, the relatively new lamps being also replaced and kept for replacement of early failures.

(Prepared by the Building Research Station, Garston, Watford, Herts.)

PUBLISHED BY HER MAJESTY'S STATIONERY OFFICE

To be purchased from

York House, Kingsway, LONDON, W.C.2 423 Oxford Street, LONDON, W.1
P.O. Box 569, LONDON, S.E.1

13a Castle Street, EDINBURGH, 2	109 St. Mary Street, CARDIFF
39 King Street, MANCHESTER, 2	Tower Lane, BRISTOL, 1
2 Edmund Street, BIRMINGHAM, 3	80 Chichester Street, BELFAST

or from any Bookseller

1955

Price 3d. net

Annual subscription 3s. 6d. including postage.

(Bulk rates are now available).

Printed in Great Britain under the authority of Her Majesty's Stationery Office
by Messrs. Watmoughs Limited, Idle, Bradford; and London



**The Ideal Background
for Mortgage Arrangements**

ABBEX NATIONAL

BUILDING SOCIETY

Total Assets exceed £213,461,000

Head Office: ABBEY HOUSE, BAKER STREET, LONDON N.W.1

CVS-286

Scheme in Progress



Perspective drawing by John Bloxham, A.A.Dipl., A.R.I.B.A.

Flats, Maisonettes, Shops Area 'C', Regents Park, London

FOR THE METROPOLITAN BOROUGH OF ST. PANCRAS

Architects: Davies and Arnold, F.R.I.B.A., Consulting Engineers: G. A. Dodd and Partners

Area 'C' comprises the construction of 240 flats, five maisonettes and five shops and is part of a scheme for erecting 1,600 multi-storey flats. The buildings will be faced with sand-faced multi-golden wirecut facing bricks. They will all have basements with lock-up storage and wash houses

LAING

JOHN LAING AND SON LIMITED, GREAT BRITAIN, CANADA, UNION OF SOUTH AFRICA, RHODESIA



ESIA